

USMC Implementation of the Quadrant Model



...From Concept to EndState

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CHAPTER 1

EXECUTIVE SUMMARY

I. BACKGROUND

The Integrated Logistics Capability (ILC) INITIATIVE of the U. S. Marine Corps (USMC) and the subsequent publication, INTEGRATED LOGISTICS CAPABILITY CASE STUDY recommended a list of action items that should be implemented. Among those items was a recommendation to institutionalize the Quadrant Model of Materiel Management in the USMC.

The USMC identified the Quadrant Model, during a Best Practices Seminar (four weeks) offered by Penn State University, as having a high potential to help improve its readiness. The participants in the Best Practices Seminar also saw an opportunity to improve efficiency (reduce logistics related costs) through the implementation of the Quadrant Model.

II. PURPOSE

The purpose of this concept paper is to report on the first phase of a four-phase set of projects to institutionalize the Quadrant Model for the USMC. Stated another way, this is the first step in taking a commercial best practice and ‘painting it green’.

More specifically this paper helps to address the following objectives:

- Provide a definition and vision of the Quadrant Model and its relationship to DOD logistics doctrine, policy, processes and operational terms
- Delineate a concept of operations for application of the Quadrant Model in the USMC
- Develop high level Business Rules for the Quadrant Model
- Analyze the impacts related to the implementation of the Quadrant Model
- Describe a desired endstate for the application of the Quadrant Model in the USMC

III. QUADRANT MODEL: Definition and Vision

The Quadrant Model can be used by the USMC to categorize (classify) inventory so as to improve the effectiveness of Procurement/Contracting, Acquisition Logistics, and Materiel Management. Rather than treat all products (NSN’s) essentially the same, the Quadrant Model implies different approaches to: managing inventory, supply chains and vendor relationships.

The basic use of the Quadrant Model is to categorize or classify inventory items (NSN’s) by their uniqueness and their value. As indicated by Figure 1E, the Quadrant Model is essentially a two-by-two matrix with four major “cells”. The horizontal axis is the value continuum of the particular item to the organization and the vertical axis identifies the risk or uniqueness of the item.

In the private sector (commercial), value is usually defined in terms of profit contribution; where as in the military, value is best determined by the item's contribution to the accomplishment of the mission. Risk or uniqueness can be defined similarly from a military or commercial perspective, namely, probability of the product not being available or the unsatisfactory quality of the item when it is delivered.

The four cells of the Quadrant Model are usually labeled – routine, leveraged, bottleneck and critical. Those designations reflect the two respective axes – value and risk. As can be seen in Figure 1E, routine items have low value and low risk; bottleneck items have low value but higher risk; leveraged items have low risk but higher value; and critical items have high value and high risk. More detailed characteristics of each of the quadrants are provided in Figure 1E.

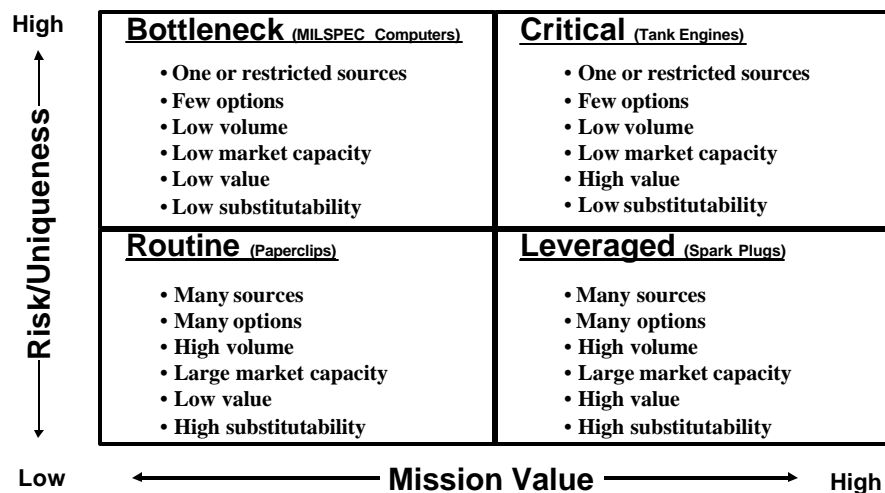


Figure 1E: Quadrant Model (USMC/"Painted Green")

The vision of the Quadrant Model application is a rationalized approach to inventory management, which does not treat all ten classes of supply as critical items. Furthermore, a tailored supply chain can be developed for each inventory classification with flexible inventory requirements and versatile delivery of products. The net result will be a more agile, flexible and leaner Corps with a higher level of readiness.

In conjunction with the Quadrant Model application in the USMC, it was necessary to analyze the associated impact of supply chain management. Using the Quadrant Model approach, dictated different supply chains for each of the four quadrants. Also, vendor relationships needed to be analyzed as well as materiel management.

IV. CONCEPT FOR APPLICATION OF QUADRANT MODEL

Frequently, logistics modernization initiatives are developed in peacetime and optimized to a garrison environment, which may result in failure during deployed operations. The Quadrant Model as outlined in the previous section and more comprehensively in Chapter 3 is particularly relevant to deployed operations. Not only can operating inventories and their upstream supply chains be shaped by the Quadrant Model application, War Reserve Materiel (WRM) can be rationalized as well.

The institutionalization of the Quadrant Model within the USMC, logistics doctrine will need to be updated to reflect the advantage of using the Quadrant Model and to streamline material management processes. Given the comprehensive impact of the Quadrant Model for the full spectrum of USMC policy must be reviewed and updated as appropriate. In general, USMC

Orders, User Manuals, etc. in the standard subject identification code 4000 series need to be reviewed for applicability of the Quadrant Model. The Quadrant Model's rationalized approach to inventory management will require process changes being in place in order to take full advantage of its benefits to the USMC. (See Chapter 4 for a more detailed discussion)

In the past, attempts to improve readiness have often been achieved at the expense of efficiency, as illustrated by the "iron mountain" of layered inventories. Conversely, greater efficiency has been achieved by decreasing the state of readiness. The application of the Quadrant Model should benefit the USMC by increasing readiness and also improving efficiency.

A concept of operations (high level implementation plan) is developed to foster moving the Quadrant Model initiative from concept to reality for the USMC. An overview and general program objectives are presented. This is followed by strategies for implementation and institutionization. Rules and responsibilities are identified along with key events to support the vision and objectives of the initiative.

V. HIGH LEVEL BUSINESS RULES

The use of business rules has gained much momentum in the private sector for a number of important internal and external reasons. The Quadrant Model implementation will necessitate the development of detailed business rules to be used to manage materiel and the related areas of procurement/contracting and acquisition logistics.

A first "cut" or high level business rules were outlined in this paper. First, a general set of rules was discussed that are particularly appropriate in the early stages of implementation. Second, a set of rules was presented in terms of the four quad areas of the model for managing materiel, vendor relations and procurement. Finally, rules were presented related to item introduction and sustainment.

VI. ENDSTATE

The Quadrant concept takes advantage of innovations in commercial business practices to (a) enhance the logistics support to the warfighter, and (b) improve the efficient use of the resources allocated to the USMC. Implementation of the Quadrant Model has been demonstrated elsewhere to offer a comprehensive approach toward risk management, reducing logistics costs, streamlining inventories, and optimizing resources (personnel, time, and money). We envision a lean; more businesslike logistics support paradigm featuring improved materiel readiness as provided through reengineered processes. Moreover, we anticipate that implementation of the Quadrant Model will create a synergy among acquisition, distribution, procurement, and materiel management functions that will help focus logistics efforts according to their value to the enterprise.

DOD enterprise-wide implementation of the Quadrant Model will provide the top-level support necessary to sustain the goal of focused logistics as described in JV 2010 and 2020. Potential benefits to the Marine Corps, however, is sufficient to warrant "going it alone" for the time being, if necessary. The rewards appear to be well worth the effort necessary for its

adoption and implementation, with the hope that demonstrated success in the Marine Corps will extend its adoption. Ultimately, we believe that success will be measured by full adoption and implementation of the Quadrant Model throughout the Department of Defense through the Defense Logistics Agency and the other services.

VI. SUMMARY

This concept paper has (a) taken a commercial sector tool, the Quadrant Model, and modified some of its components for the military; (b) addressed its potential applicability; and (c) considered its impacts by identifying the benefits and risks associated with its application in the USMC. The Quadrant Model is a strategic concept executed at the tactical level in support of operational effectiveness and logistics efficiency. It applies a scalable approach for the procurement of items and services. The application of the tenets contained in this concept paper will be a catalyst for implementation of the principles of the Marine Corps Logistics Transformation/Logistics Campaign Plan.

CHAPTER 2

OVERVIEW OF QUADRANT MODEL AND RELATED BEST PRACTICES

INTRODUCTION

The USMC has recognized that its external and internal environments changed dramatically during the latter part of the 20th century and that the rate of change is increasing as we move into the 21st century. The ILC INITIATIVE and associated CASE STUDY pointed out that the USMC was relying upon processes developed during the 1960's; and organizations and technologies established and developed during the 1970's and 1980's.

In keeping with the Joint Vision 2010 (JV 2010) of the Joint Chiefs of Staff, the ILC INITIATIVE called attention to the JV 2010 concept of Focused Logistics – “Ensuring the right logistics support to the right customer at the right time while providing real-time data to the warfighter (read customer) as to the status and location of supplies, equipment and personnel.” Furthermore, the ILC Initiative, indicates that a key dimension to the objectives of Focused Logistics is the reduction of materiel overhead and improvement of the USMC business paradigm while delivering state of the art logistics products and services to ensure state of the art readiness for the warfighter – lean and lethal combat capability.

Recognizing the importance of improving the business paradigm, the ILC INITIATIVE adopted a rigorous methodology, which included a four-week, Best Logistics Practices Seminar provided by Penn State University through the auspices of its Center for Logistics Research. After discussing and analyzing what was possible in the commercial sector, a vision was created of where the USMC needs to be, taking into consideration appropriate military constraints.

A number of key findings and recommendations for the USMC evolved from the Best Practices Seminar and subsequent sessions. One of those key findings and recommendations was to institutionalize a commercial best practice called the Quadrant Model, which categorizes or classifies items so as to rationalize inventory levels, location, and associated activities in procurement, acquisition and materiel management. Used in conjunction with supply chain management strategies and the Supply Chain Operations Reference (SCOR) Model, the Quadrant Model will enable the USMC to enhance readiness and overall effectiveness while simultaneously improving efficiency. However, the major focus is upon the warfighter's effectiveness in this paper.

METHODOLOGY

This concept paper builds upon the ILC INITIATIVE and CASE STUDY. The concept paper is one of the deliverables from the first phase (A) of a four phase joint project of the USMC, Sapient Corporation and Penn State University's Center for Logistics Research.

The concept paper is the product of the following:

- One week planning session held December 11-15, 2000 at the Center for Naval Analyses in Washington, D.C. which was organized by the USMC.
- One-week workshop held December 18-22, 2000 at the Center for Naval Analyses in Washington, D.C. with attendees from the USMC, the Navy, the Defense Logistics Agency (DLA), Penn State and various consultants.
- A meeting to assimilate the information and develop a draft of the Concept paper held at Penn State University January 3-5 and January 8-12, 2001 with attendees from the USMC, Sapient, Penn State and several consultants.

The second phase of the project will investigate the implementation of the Quadrant Model by selected commercial firms to provide data on vendor relationships, acquisition strategies, business rules for classifying NSN's, metrics and tools of analysis. The third phase, which will be directed and hosted by Sapient Corporation in Washington, D.C., will build on what has been developed in this concept paper by developing a "roadmap" for applying the Quadrant Model Concept in the USMC. The third phase will also identify appropriate pilot models for the Application of the Quadrant Model in the USMC. The fourth and final phase of the joint project will build upon the first three phases and will provide testing and validation of the Quadrant Model Concept. It will further develop the business rules for applying the Quadrant Model and will statistically test its validity using a sample of NSN's relevant to the USMC.

BACKGROUND

During the 1980s, commercial enterprises were faced with two significant external issues: the high cost of financing ongoing operations and the need to adopt a total quality management culture. These externalities were manifested in business decisions to reduce inventories and to rationalize the supplier base with the goal of improving cost leverage and enhancing the robustness of supplier relationships. Concurrent with these developments, software designers developed improved information technology capabilities that provided better visibility and management of materials and finished products. The technology developments allowed companies to substitute information for inventory.

Downsizing of organizations and even greater limitations on the resources available to sustain the business continued to pressure firms to "do more with less." Some companies realized that not all items or supplier relationships were worthy of the same expenditure of resources. One of the first tools to emerge dealing with this issue was a segmentation methodology, better known within some industries (as well as the USMC) as the Quadrant Model.

During the same time period that the Quadrant Model was being developed, a related concept called supply chain management (SCM) was also developed because of the recognized need to improve visibility of inventory beyond a company's immediate vendors and customers. It was anticipated that the extended visibility would reduce uncertainty of demand, which in turn would lower the need for safety stock. In addition, the development of a supply chain approach led to the formation of the Supply Chain Council (SCC). The latter group of academics, companies, and consultants saw the need to arrive at a standard definition of a supply chain, including processes and metrics. The purpose of the SCC was to develop a common model that

would have applicability between both private and public sector organizations. The outcome was the SCOR Model. The following sections detail the two models and the concept of supply chain management.

SUPPLY CHAIN MANAGEMENT

Supply chain management (SCM) has been defined as “a collaborative-based strategy to link cross-enterprise business operations to achieve a shared vision of market opportunity. It is a comprehensive arrangement that can span from raw material sourcing to end consumer purchase.” Thus, a supply chain initiative embraces multiple organizations or parties. It also takes into consideration the entire length of the supply chain, from raw materials to the final consumption point. Hence, decision makers who are responsible for only a portion of the supply chain must understand how the various links in the chain operate. A supply chain can only be as strong as its weakest link. Aggressive supply chain programs in the private sector have resulted in as much as a 50 percent reduction in inventory days of supply. Supply chain management initiatives can result in a reduction of 25 percent of an organization’s logistics operating costs.

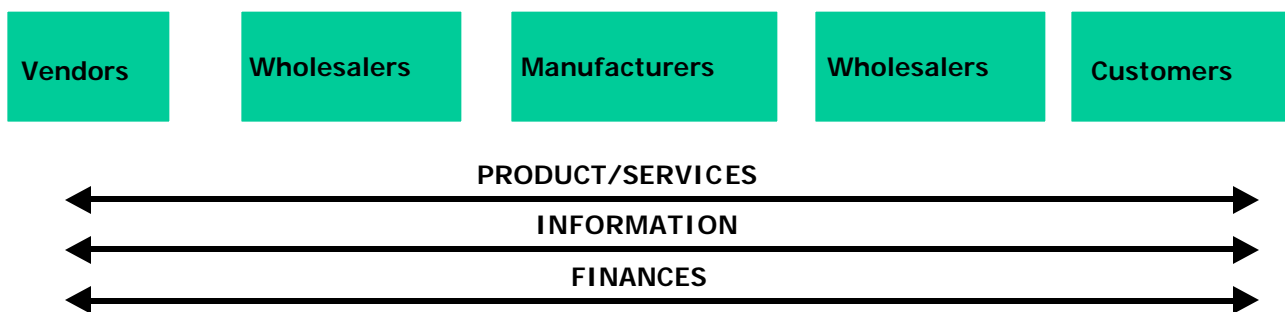


Figure 1: The Generic Supply Chain

Successful SCM is based upon the integration and management of three types of “flows,” or basic processes/products, information, and cash. Products, information, and cash flow among the different members of the supply chain. All three flows are bi-directional. It is easy to understand bi-directional flow in the case of cash and information, but with the growing importance of reverse logistics, it has become increasingly relevant for products, too.

Finally, from the customer’s perspective, SCM attempts to ensure the availability of the Seven R’s:

- Right product,
- In the right quantity,
- And the right condition,
- At the right place,
- At the right time,
- For the right customer,

- At the right cost.

Increasingly, firms from a broad range of industries have begun to recognize that there is an eighth “right” that is fundamental to their contemporary competitive strategies, specifically:

- With the right information

THE SUPPLY CHAIN OPERATIONS REFERENCE (SCOR) MODEL

The SCOR Model is the product of the Supply-Chain Council (SCC), an independent, not-for-profit, global corporation with membership open to all companies and organizations interested in applying and advancing the state-of-the-art in SCM systems and practices. The council has over seven hundred members, mostly practitioners, and represents a broad section of industries, including manufacturers, distributors, and retailers. Equally important to the council and the advancement of the SCOR Model are the technology suppliers and implementers, the academicians, and the government organizations that participate in council activities and the development and maintenance of the model.

The scope of the model has changed over time, and future changes are anticipated based on Council member requirements. The model is designed and maintained to support supply chains of various complexities. The SCOR Model is a business process reference model that links process elements, metrics, best practices, and the features associated with the execution of a supply chain in a unique format. It is important to note that this model describes processes, not functions. In other words, the model focuses on the activity involved, not the person or organizational element that performs the activity.

The SCOR Model, as shown in Figure 2, enables organizations to apply state-of-the-art SCM systems and practices. This model improves customer-supplier relationships, increases the usage of software systems with universal measurements and terminology, and hence provides organizations the flexibility of adopting best practices emerging in other organizations from both the private and public sectors.

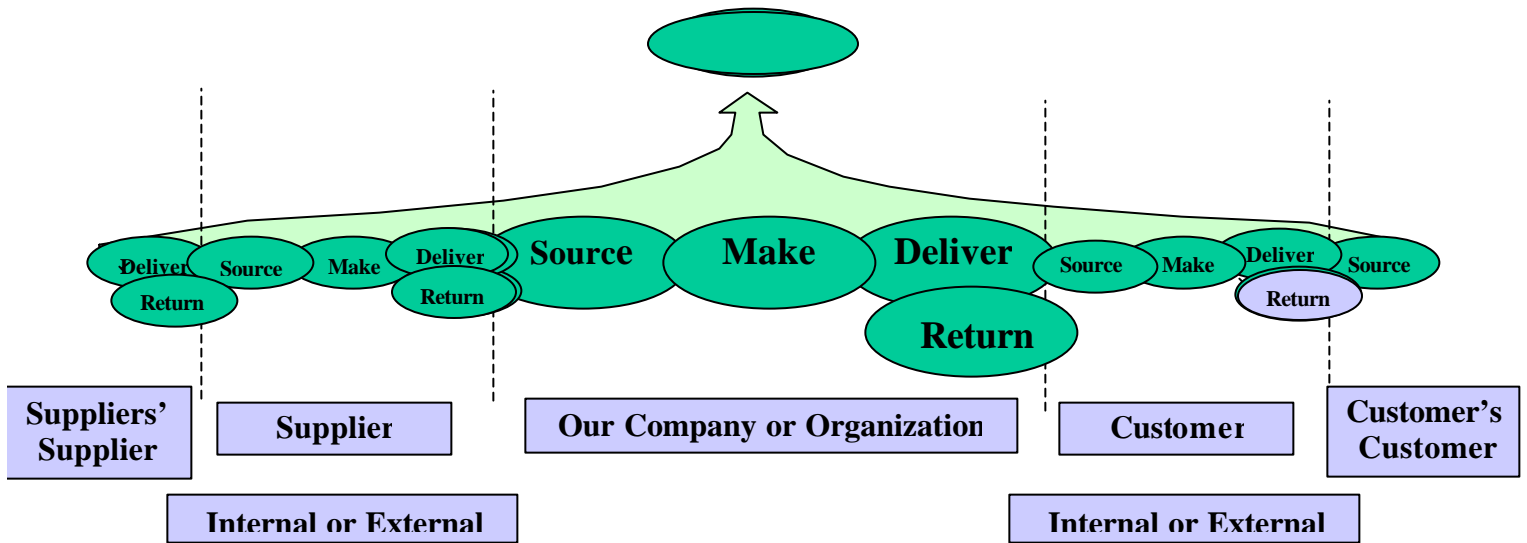


Figure 2: The SCOR Model

The SCOR Model captures the “as-is” state of a process and arrives at the desired “should be” state. It comprises the five management processes of *plan*, *source*, *make*, *deliver*, and *return* within each part of the supply chain. While *plan* is an overarching activity encompassing collaborative forecasting, gathering, processing and disseminating information, and addressing such matters as capabilities and capacities, the others have discrete elements with hooks to both their upstream and downstream counterparts. *Plan* includes all activities that are undertaken to align expected resources to meet expected demand requirements. *Source* is the activity involved with obtaining materials or products from others, whether internal sources or external. *Make*, while often confused with manufacturing, is the activity involved in changing the form of the item, including its packaging or make-ready condition. *Deliver* is taking the item from *Make* and preparing its transfer to the next entity’s *Source* activity. The newly created *Return* provides for the flow of items back to original suppliers for repair, rework or even disposal. By describing supply chains using these process building blocks, the SCOR Model can be used to describe the depth and breadth of virtually any supply chain. The model has been able to successfully describe and provide a basis for supply chain improvement for global projects as well as site-specific projects.

THE QUADRANT MODEL

In the commercial sector every item or service purchased has a relative value or profit-making potential to the organization. Similarly, the supply market from which they are obtained may present various levels of risk in forms of availability or the quality/condition of the item. Risk is also manifested in uniqueness, which affects the number of potential suppliers available and may constrain the number of potential suppliers. Taking these two dimensions together provides a two-by-two matrix, as illustrated in Figure 3.

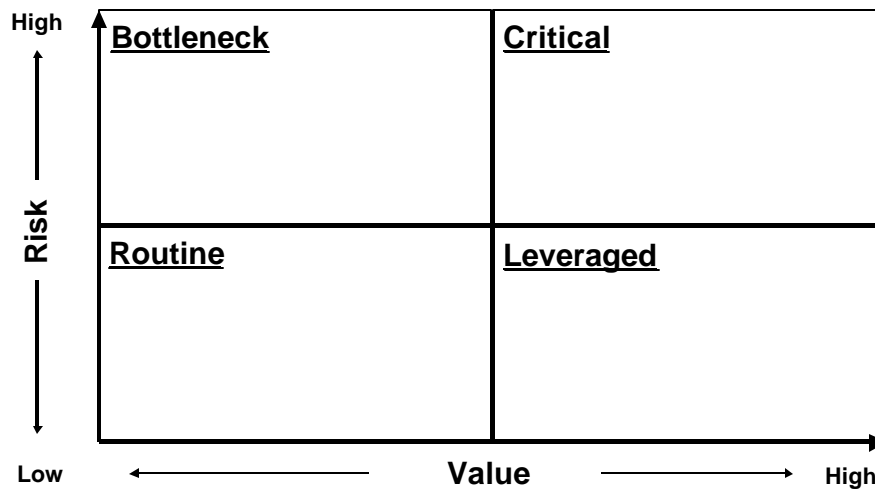


Figure 3: The Commercial Quadrant Model

While there may be many cells within the matrix, four are used to explain the four basic conditions found in purchasing, acquisition logistics, and materials management.

Routine

Low value and low risk/uniqueness items are found where the buyer has many options available from potential suppliers. The marketplace has established the product standard, which means that there is usually very little brand loyalty. While traditionally buyers focused primarily on price of routine items, the more sophisticated ones realize that the driving issue is the cost of the procurement process borne by both buyer and seller and, therefore, strive to reduce its impact. The readily available nature of the goods in this quadrant means that buyers should avoid inventorying them. Sellers can usually provide routine items on an as-needed basis. Office, safety, and maintenance supplies are the most frequently identified examples of this type.

Bottleneck

These items have the same low value or profit potential as the routines, but possess an element of risk in that there are few suppliers available and/or that the particular item has little or no potential for being substituted. Under normal circumstances, availability is the important issue with bottlenecks inasmuch as price under such constraints is much less important. Buyers focus on expediting or improving delivery in the short term and eliminating the potential for creating such bottleneck situations; for example, selecting suppliers of the end item who have a reputation for readily available spare parts in the long term. Equipment spares and components

are the most common examples. Some inventorying can be expected to take place, including items with low turnover ratios for “insurance” because they may be necessary to have on hand.

Leveraged

Low risk or uniqueness and high value characterize leveraged items which some also refer to as commodities. There are multiple sources available, with cost and delivery being the decision points when selecting suppliers. The supply market usually dictates quality attributes. Buyers may undertake some degree of opportunism when playing one supplier against another at different points in the business cycle. The commercial sector sees many industrial chemicals, metals, minerals, and forest products as representative of leveraged items. The most astute buyers with the realization that supplies are readily available from multiple sources maintain minimal inventories.

Critical

High value and high risk or uniqueness by definition suggests a category of materials that buyers will need to manage carefully. They are available from a few sources or maybe only one source. They are unique because of the limited quantities in which they may be available, as well as their physical characteristics, which frequently depend upon supplier-held technology or other similar capabilities. Price is not a principal issue; rather, the value that the supplier adds to the buyer’s organization becomes central to the relationship. Wherever possible, buyers and sellers of items in this category seek higher quality relationships over a longer period of time. Inventories are normal, but the extensive sharing of information between the parties concerning future demand as well as enhancements or new technological developments usually helps to minimize inventory levels.

SUMMARY

The circumstances that found utility in developing and applying the Supply Chain Concept, the SCOR and Quadrant Model in the commercial sector apply also in the military sector. Constrained budgetary and human resources, collapsing product life cycles, and the ability to rapidly project forces demand that military supply chains also require segmentation using the Quadrant Model in order that resources be focused on those particular items so requiring it. Doing so dictates that understanding the suppliers, and perhaps even the suppliers of those suppliers, can add levels of visibility that not only leverage the constrained precious resources but contribute to increased levels of readiness as well. The next chapter will address more specifically the application of the Quadrant Model in the USMC.

CHAPTER 3

DEFINITION AND VISION OF QUADRANT MODEL

INTRODUCTION

The previous chapter provided a commercial overview of the Quadrant Model as it pertains to industry best practices. This chapter will redefine the Quadrant Model and related concepts in the framework of the Department of Defense and, more specifically, the United States Marine Corps. Redefining the Quadrant Model in the context of the USMC requires an examination of several important areas impacted by the Quadrant Model. These areas include Materiel Attributes, Supply Chains, Vendor Relationships and Materiel Management. Additional areas are discussed in Appendix B.

Quadrant Model: USMC Overview

Materiel Attributes

As discussed in the previous chapters, the two major determinants of the attributes of a given product/item are its “value” to the enterprise (the horizontal axis of the Quadrant Model) and its relative “risk” in terms of the likelihood of its being unavailable in the form/condition and/or at the time needed (the vertical axis). In the commercial sector, value is defined by profit potential. In the military, value should be defined in terms of an item’s contribution to the accomplishment of the mission. Mission value becomes the primary differentiator between the bottleneck and routine sections on the left side of the Quadrant Model and the critical and leveraged sections on the right side. The value to the USMC enterprise must be determined based on the enterprise’s overarching stated mission, which can be paraphrased as “Winning Battles and Making Marines.” Therefore, an item’s mission value can be ascertained within the context of those two areas. However, the emphasis in this paper will be upon “Winning Battles” since it has been defined more specifically.

Much study and analysis has been focused on the “Winning Battles” element of the USMC’s mission. The Mission Area Analyses performed by Marine Corps Combat Development Command (MCCDC) on behalf of the USMC (and other similar efforts conducted throughout the Department of Defense [DOD]) have categorized and assigned values and relative rankings to the various mission areas (see Appendix B). The relative mission value of a given product or item can thus be determined based on the importance of its contribution within a mission area and that mission area’s value/ranking relative to others. For example, in Mission Area C10, “Attack Targets,” a weapon system’s (or a munition’s) lethality relative to others would be considered. That same weapon system would be evaluated, relative to others, within the remaining Mission Areas (C2, “Conduct Maneuver/Maintain Mobility,” etc.) to achieve a final aggregate ranking based on its value within each Mission Area and the relative values of the Mission Areas to one another. The result would define its overall mission value to a high level of specificity (the basic halves--left and right--along the horizontal [value] axis of the Quadrant Model sub-divided into many more differentiating cells). When combined with the risk criteria discussed below, most of the products contained within the ten classes of supply currently

used/consumed by the USMC, can be categorized and highly differentiated within the Quadrant Model in the context of the “Winning Battles” element of the stated mission.

Considerable effort continues to be expended in the pursuit of better defining and optimizing the process related to “Making Marines”; however, no value assessment or ranking of the various associated sub-activities has, to our knowledge, been accomplished. The number of items used/consumed by the USMC exclusively in support of this mission element (e.g., products that improve quality of life, etc.) is small in both variety and quantity. Their categorization and the resulting benefits would apply if such a valuation/ranking effort were undertaken. Lacking such a detailed analytical framework, consideration will not be given to the “Making Marines” dimension of value in this paper. Figure 4 outlines examples of some specific mission value-related characteristics. (These characteristics are not all-inclusive).


Mission value related characteristics	Low  High
Lethality	None—Non-lethal-- 1:1 Kill Ratio-- 1:Many Kill Ratio—Mass
Mobility	None----Slow/Low Cap./Single Mode--/Fast/High Cap. Multi-mode
Communication	Admin /Training/Garrison Secure/Battlefield non-secure/Battlefield secure
Protection	None—Ballistic (small arms/large caliber/Etc.)—NBC—Multiple

Figure 4: Mission Value Characteristics Continuum

In the commercial sector, the supply market from which every item or service is purchased or obtained presents a level of risk relative to the availability or quality/condition of the item. Unlike value, risk criteria for the military closely mirror those of the commercial sector. The risk criteria that are usually considered are as follows:

- Availability/uniqueness, determined primarily by the number of sources (vendors) from which the product can be acquired (factors such as transportability are subsumed within this criterion)
- Product suitability/reliability/dependability/durability (includes factors such as quality, technological obsolescence, etc.)
- Redundant capability (substitutability), determined primarily by the number of like or similar products/items that can fulfill the same requirement
- Production/market capacity/flexibility, defined as the ability of the source(s) to respond to fluctuations in demand (seasonal demand variability, demand surges, etc.)

Examples of some characteristics that amplify the risk criteria are outlined in Figure 5. (These characteristics are not all-inclusive)

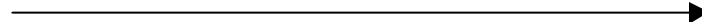
Risk Related Characteristics	Low  High
Availability of Potential Sources	Virtually infinite/Multiple Sources/Sole Source/Government Only
Product Specifications	Market expt./COTS/Functional/Performance/Design/Proprietary Sole Source
Product Reliability	Remote risk of failure/predictable rate of failure/unpredictable rate of failure
Product Dependability	Unchanging Standard/Low Variability/High Variability
Technological Obsolescence	Very Long Life Cycle(>25yrs)/Long LC(>5yrs)/Med LC(<5years)/Short LC(<18Mos)
Cycle Time Reliability	Low/Medium/High/Very High Deviation from the Mean
Transportability	No special considerations/Oversize(weight or dimensions)/Special Handling (HazMat)

Figure 5: Risk Characteristics Continuum

The combination of mission value assessments with risk assessments determines product materiel attributes and categorization (segmentation) within the Quadrant Model (See Figure 6). In other words, the various supply items can be assigned to the quadrant “cells” based upon their value and risk to the USMC.

Quadrant Categories in the USMC

As indicated previously, there are some differences between the military and the commercial sectors. However, there are many similarities when you apply the Quadrant Model, in terms of value and risk to segment items. This section analyzes the four quadrants from a USMC perspective.

Routine items have low value and low risk and supply chain stockouts will have minimal impact on the USMC’s ability to accomplish its mission. Concurrently, because routine items are largely standardized in plentiful supply from a wide variety of vendors, the likelihood of supply chain failure is remote. The market sets the standards of quality, suitability, durability, etc. Any vendor who fails to meet the standards of the highly competitive market place will not survive. Office supplies, many administrative supplies, and other supply class II and pre-expended bin items are USMC examples of routine products

Bottleneck items share many of the same attributes of routine items. These low-value items pose concern to the organization only because of their higher risk. Bottleneck items are defined as such because either the USMC or the characteristics of the supply market have caused them to be specialized (typically over-engineered or over-specified) in such a manner as to reduce their sourcing options in spite of their low value. Examples of bottlenecked items include the “\$400 hammers” and similar items that have made news headlines in recent years.

A leveraged item can be distinguished from a routine item by its value to the mission of the USMC. Leveraged items, for example, have weapons system impact (within the context of the “winning battles” mission element) and generally have higher cost. Although high in mission value, there is little potential for mission damaging supply chain disruption because of their wide availability from multiple sources. Examples include common repair parts for militarized commercial equipment, most POL products, and many supply class I and IV items.

Traditionally, within a military context, there has been a tendency to describe most items of high mission value as “critical”; therefore, it is important to emphasize the departure from past practice imposed by application of the Quadrant Model. In the context of the Quadrant Model, both mission value and risk (both axes of the model) must be assessed together to determine “criticality.” The element of vulnerability in the supply chain is the principal differentiator of critical items from those that are leveraged. This characteristic dictates more intense and specialized acquisition and management practices (to be discussed later). Examples include military unique end-items and their repair parts, most (but not all) supply class V items, and some packaged POL products used in highly specialized applications.

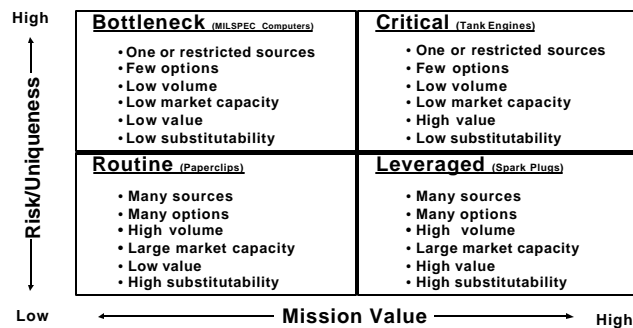


Figure 6: Materiel Attributes within the Quadrant Model

SUPPLY CHAINS IN THE USMC

As stated previously, supply chain is a series of enterprises that share information and coordinate physical execution to ensure a smooth flow of goods, services, information, and financials through the supply pipeline. Supply chain management is a dynamic process that involves the acquisition and continuous reevaluation of partners, technologies, and organizational structures. The Quadrant Model identifies the need for the USMC to have multiple supply chains, driven by the characteristics of the items in each cell of the model, rather

than a single supply chain in which all products are treated the same. This section analyzes the different supply chains required using the Quadrant Model approach.

Routine

The expansive vendor base characterizes the supply chain in the routine area of the Quadrant Model. The supply chain for routine items need only extend to the vendor node with little or no activity at the wholesale level, resulting in a compressed chain. The vendor node, however, is extensive as routine items are available from multiple sources with a very high rate of substitutability. Relationships with these vendors will be conducted primarily at the retail level and will be transactional in nature. The routine supply chain will be shallow in terms of depth but rather wide in terms of breadth. (See Figure 7)

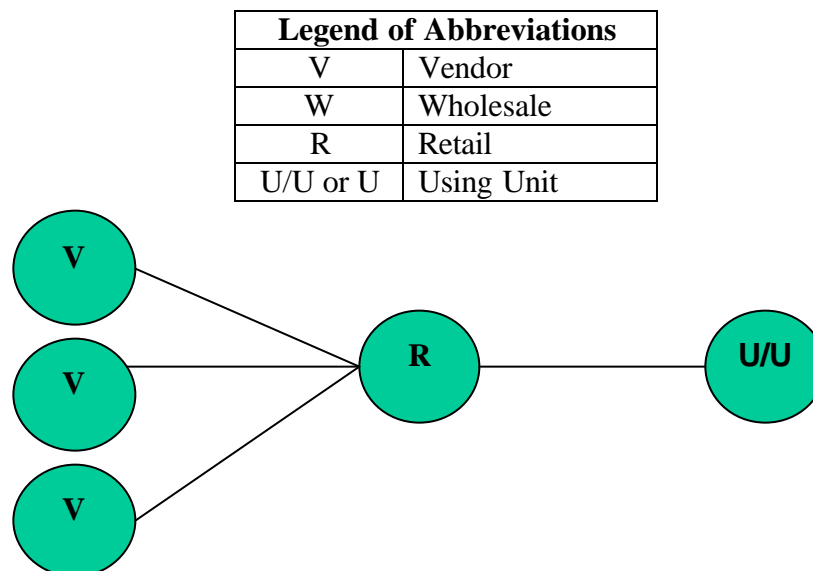


Figure 7: Supply Chain Characteristics (Routine)

Bottleneck

Items in this quadrant usually have few options and sources for obtaining the bottleneck materials. The supply chain for low mission value bottlenecks may go no further than the vendor node; their low value diminishes the need for visibility and management beyond that point. Unlike routine items, however, the vendor base is extremely limited. The resulting supply chain will be very lean but no longer than necessary to ensure item availability. For this reason, a level of management may be necessary at the wholesale level for some bottleneck items. (See Figure 8)

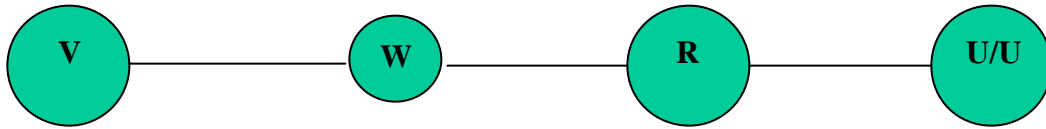


Figure 8: Supply Chain Characteristics (Bottleneck)

Leveraged

As mission value increases, so does the requirement for increased visibility as well as the desirability of holding inventories at the retail and wholesale levels. Planning for this supply chain requires control over vendor quality relative to configuration, delivery, and the product per se. Supply chains for leveraged items differ from those of routine items in that there needs to be an increased depth of visibility and planning. The leveraged supply chain will be robust in width. Leveraged items will require visibility and monitoring at the retail and wholesales level to ensure that the risk does not “drift” into higher risk categories. (See Figure 9)

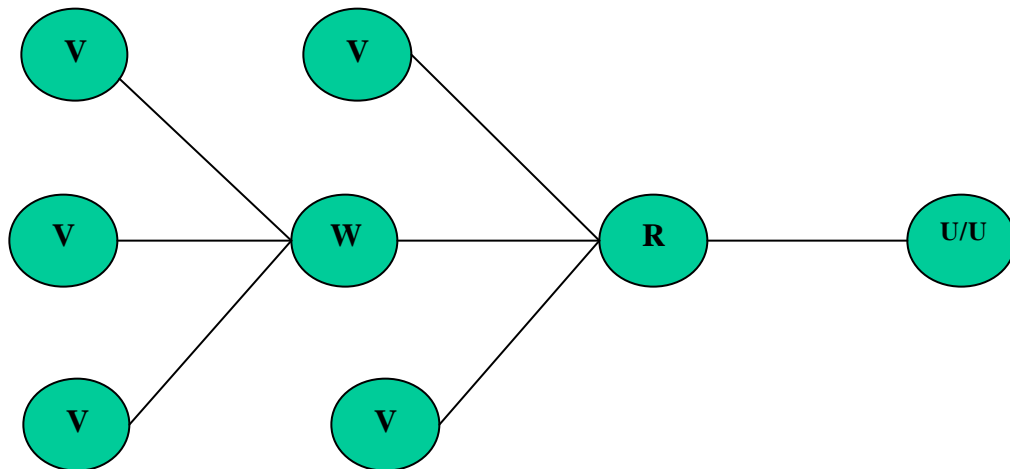


Figure 9: Supply Chain Characteristics (Leveraged)

Critical

The long length of the supply chain characterizes the supply chain for the critical quadrant. Because products in this quadrant have a high level of mission value, as well as a high degree of risk, non-availability becomes more of a concern. Therefore, it may be necessary to

extend the supply chain all the way back to raw materials sourcing to ensure uninterrupted supply. Like bottleneck items, the vendor base for critical items is extremely limited so the supply chain will be narrow and possibly deep. It will be necessary to maintain visibility and management at all levels of the supply chain within the critical cell. See Figure 10.

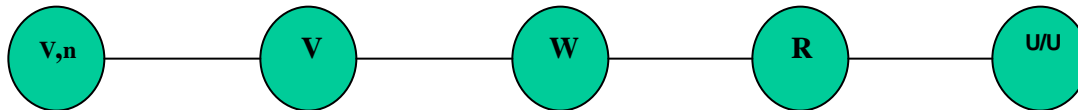


Figure 10: Supply Chain Characteristics (Critical)

The preceding paragraphs described the impact of Quadrant Model application on the configuration of the USMC supply chain. To capitalize on the efficiencies inherent in the Quadrant Model, it will be necessary to construct multiple supply chains. The structure of each of these chains will be customized according to the value and relative risk associated with the items within those chains. Figure 11 summarizes the differences among the supply chains by quadrant cells.

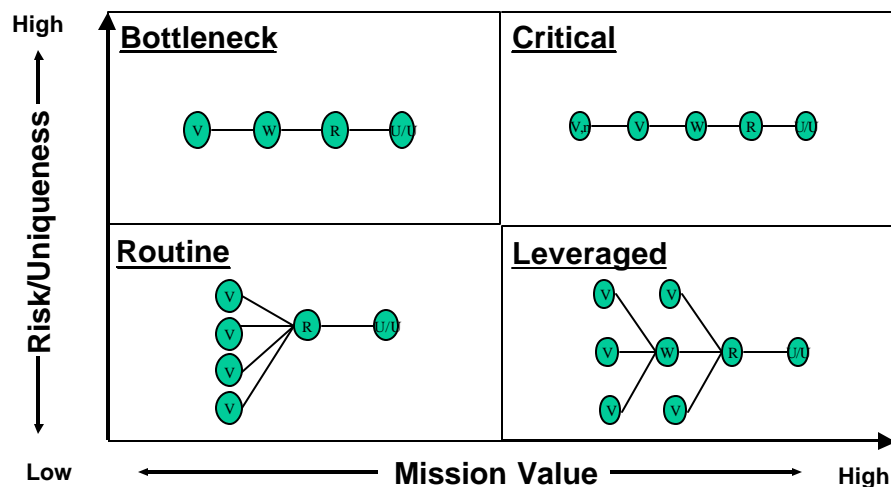


Figure 11: Supply Chains (Quadrant Model)

Vendor Relationships

The previous section described the supply chains for items from each cell of the Quadrant Model. This section overlays the integration and planning aspects of the SCOR Model onto those

supply chains by describing the nature of customer-supplier relationships as well as the level of USMC effort and involvement in the planning process.

Contractual relationships run the gamut from instant/transactional purchases to strategic total lifecycle relationships. A brief description of each of these types of relationships follows:

- Instant (Spot) Purchase – Transactional, one time buy, little or no competition (on behalf of government purchasing personnel), no information sharing required.
- Annual Relationship – Single contractor award, normally not requiring the degree of shared information of the first three tiers.
- Multi-year Relationship – Length of the contract dictated by need and often statute or regulation. Multiple award (several contractors providing like items/services) contracts help to minimize the government's risk.
- Strategic Support Lifecycle Relationship – Differs from the tier above in that this support is provided after production, not necessarily provided by the OEM. Involves a second competitive procurement process. Risk is shared between the government and the contractor.
- Strategic Total Lifecycle Relationship – Differentiated from the next tier because this tier includes “cradle to grave” responsibility by the contractor. The contractor would produce an item and support it throughout the lifecycle. Risk is shared between the government and the contractor.

Theoretically, it would be possible to use all of the above relationships for each of the four basic types of Quadrant Model items. However, such an approach would not add value to an organization. For example, routine items obviously do not require total lifecycle relationships.

Routine

For routine items, cost is the determining factor. Consequently, a transactional, “three bids and a buy” type of relationship is most appropriate. As mission value increases, there is a corresponding increase in the importance of quality, performance, and performance of suppliers. Routine items should require limited management along the supply chain. The USMC does not need to maintain collaborative types of relationships with individual vendors at this level. (See Figure 12)

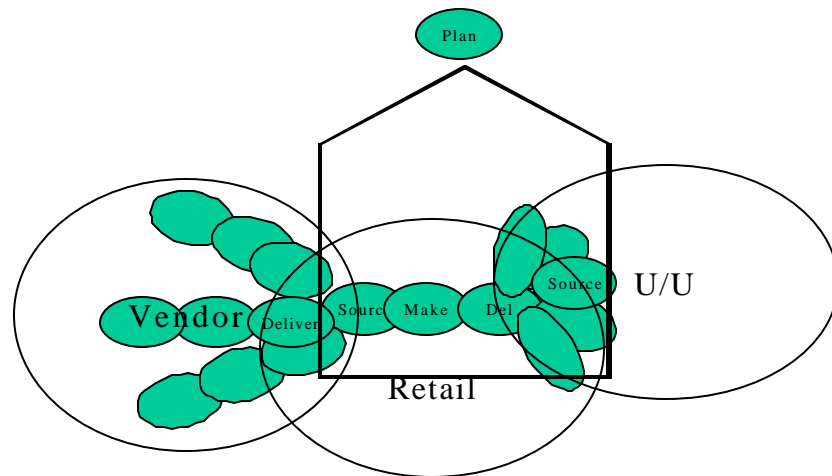


Figure 12: Vendor Types and Relationships (Routine)

Bottleneck

There are several types of relationships possible for bottleneck items, depending upon the degree of risk and value along the vertical and horizontal axis. Some bottleneck items can be purchased on a transactional/spot market basis, whereas others can be purchased on a fixed price annual contract. Special contracts such as cost plus may be utilized to allow the government to share the risk with the supplier as mission value increases. The role of the USMC in the planning process for bottlenecks should be mainly at the wholesale level and to some degree at the retail level to mitigate the risk of stockouts. (See Figure 13)

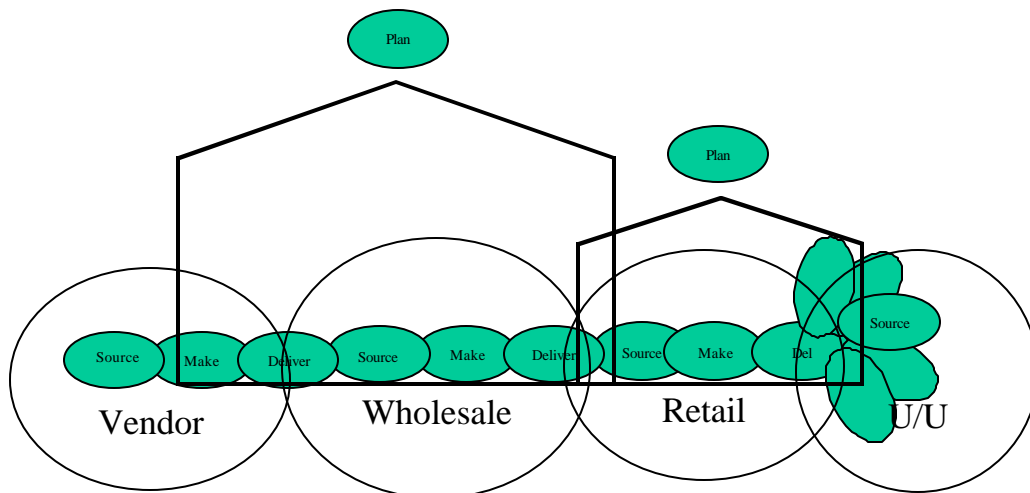


Figure 13: Vendor Types and Relationships (Bottleneck)

Leveraged

There are several types of vendor relationships that are possible for leveraged items, depending upon an item's location along the risk and value continuum within a particular quadrant sector. Initially, a close relationship may be developed for a new item based upon some type of cost incentive. High mission value items may require more stable contractual relationships, but the large vendor base in this cell generally minimizes the managerial level of effort. The higher value of leveraged items will require USMC monitoring at the wholesale and retail links in this supply chain. (See Figure 14)

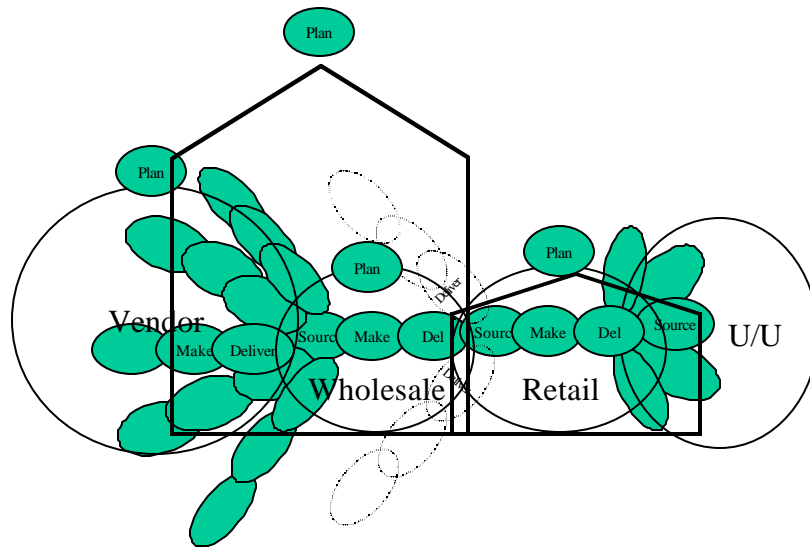


Figure 14: Vendor Types and Relationships (Leveraged)

Critical

Critical items usually require a strategic, win-win relationship with vendors. The government should require detailed information about the vendor as well as its supply chain. Relationships should usually be long term and collaborative in nature. Ideally, both parties will share information related to demand, inventory levels, availability, lead-time, etc. The use of the industry best practice of Collaborative Planning, Forecasting and Replenishment (CPFR) is standard in this cell of the quadrant. In special circumstances, critical item vendors may need subsidization to remain financially viable. The USMC should be involved in the planning and management of the entire supply chain for critical items. It will be necessary to extend this integration well beyond the vendor level, possibly even to raw material sourcing. (See Figure 15)

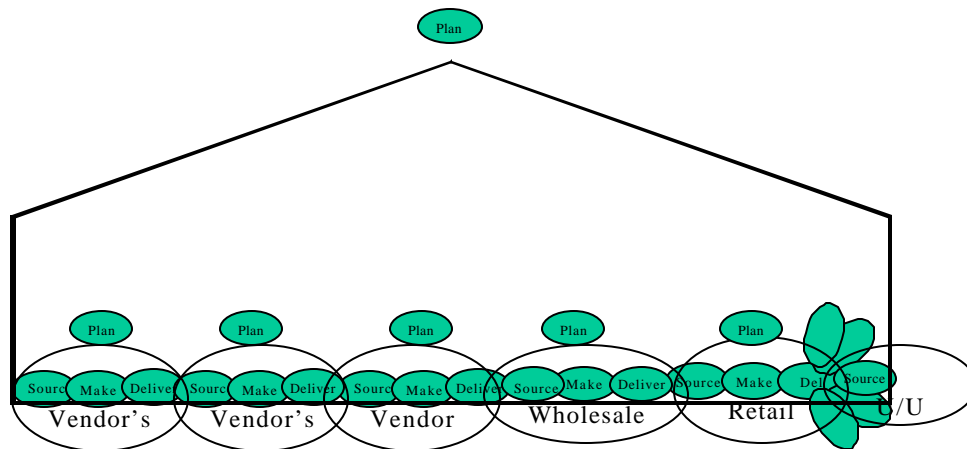


Figure 15: Vendor Types and Relationships (Critical)

Figure 17 below merges the respective cells of the Quadrant Model discussed above. Furthermore, the figure provides a template to develop appropriate customer-supplier strategies and tactics based on an item's mission value and risk to the enterprise. Tailoring the interactions and relationships with vendors according to the Quadrant Model facilitates optimization of the supply chain. The preceding text and graphics explain the differing conditions and types of relationships required to implement the Quadrant Model within the USMC. Based on the location of an item in the Quadrant Model, only those resources necessary to effect mission accomplishment would be expended. (See Figure 16) The next two sections on acquisition and materiel management build upon the Quadrant Model development for the USMC.

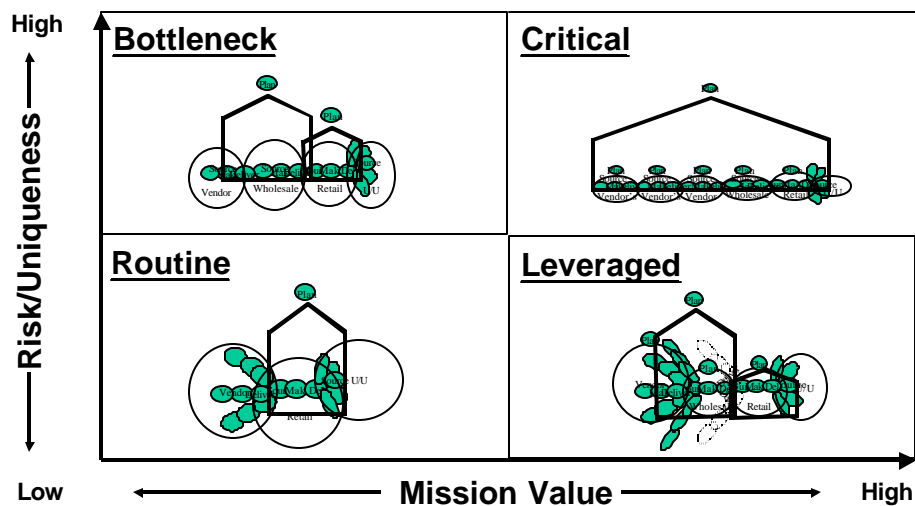


Figure 16: Vendor Types and Relationship (Quadrant Model)

MATERIEL MANAGEMENT

The essence of most inventory decisions and the basis for the economic order quantity (EOQ) Model is the tradeoff between the costs of holding inventory versus the transaction costs associated with ordering. The Quadrant Rank Model enhances the EOQ Model by identifying the quantity and stocking location, which should incur the cost, what specifically is stocked, and finally, who has responsibility for the items.

Industry's best practice is to analyze and rationalize supply chain physical network design in order to minimize redundant inventories and improve inventory location. The USMC currently stores the same products in multiple locations of the supply chain and achieves combat effectiveness through mass (redundant inventory), as opposed to precision (properly located rationalization inventory and optimized distribution). The USMC can achieve mission effectiveness and combat readiness with a significantly reduced footprint by analyzing and rationalizing inventory levels and locations.

Routine

The availability of routine items suggests that a user can get them quickly since many vendors are already holding inventory. Inventory would be procured and held only at the retail level and, then, only in anticipation of significant surges in demand or temporary disruption in availability; e.g., to support unit deployments, large-scale exercises, etc. Because of the low mission value of these products and the transactional nature of USMC relationships with the vendors, there would be little motivation by either party to arrange for vendor-owned inventories to be held at retail stock locations. See Figure 17.

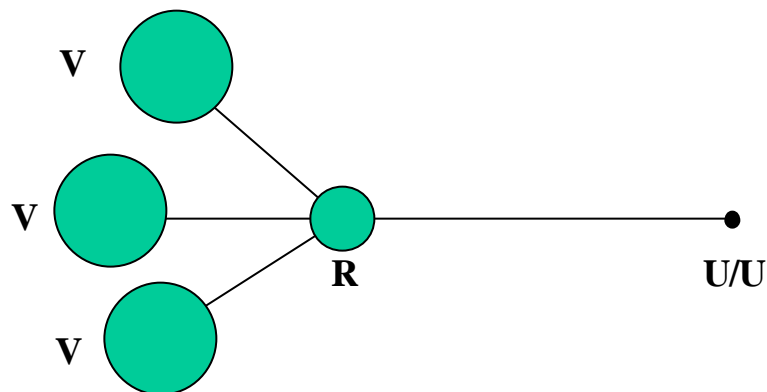


Figure 17: Inventory Rationalization (Routine)

Bottleneck

Bottlenecks, with their increased risk/uniqueness dimensions, may require some level of safety stock. Because the costs associated with holding such inventories would weigh heavily in relation to responsiveness concerns, inventories should be held at the wholesale level to maximize efficiency and achieve economies of scale. As noted previously, relationships with vendors of bottleneck items should be more enduring than those with vendors of routine or leveraged products. Therefore, negotiating for vendor retention of ownership of stocks at wholesale inventory locations (to further lower costs) would be a possibility. As with routine products, there should be a heavy reliance upon vendor-held stocks, with none routinely held at retail levels (see Figure 18). Most inventories could be owned and held by the vendor until demand is generated. Minimal inventories could be held at the wholesale level, possibly with the vendor retaining ownership, until demand is generated.

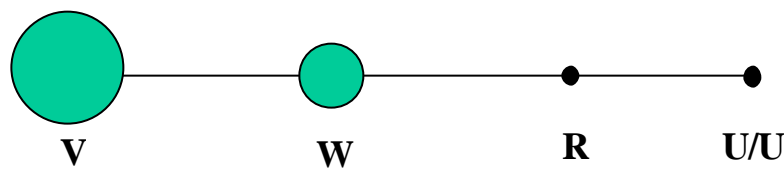


Figure 18: Inventory Rationalization (Bottleneck)

Leveraged

With risk factors similar to those of routine items, the bulk of leveraged item inventories should be vendor-held. However, the increased mission value dictates that some inventories (operating stock levels) be routinely bought and held at the retail level to ensure responsiveness to customer demands. Leveraged items should be adjusted upward when necessary to meet anticipated temporary demand surges such as unit deployments. Because relationships with vendors would still be largely transactional in nature, these stockage levels would necessarily be USMC-owned. The USMC's materiel manager (MATCOM) would monitor leveraged products and their sources to ensure continued availability but would hold inventory only on an exception basis (see Figure 19). Most inventories could be owned and held by the vendor until demand is generated. Minimal inventories could be bought and held at the retail level.

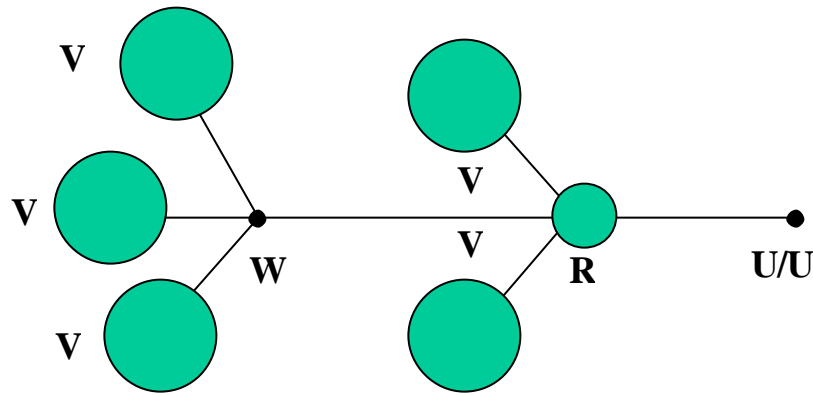


Figure 19: Inventory Rationalization (Leveraged)

Critical

Critical items (simultaneously of high mission value and high risk) should be held at the retail, wholesale, and vendor levels in sufficient quantities. Their high mission value dictates that these items be stocked in sufficient quantity to be immediately responsive to customer demands. Therefore, they must be located as close to the point of consumption as is reasonable, prudent, and practical. This dictates that the bulk of USMC-held critical items be stocked at the retail level. The strong vendor relationships that should pertain to these items would make it feasible for vendors to retain ownership of these inventories even when held at retail and wholesale stock locations (see Figure 20). Inventories could be held at all levels in the supply chain, with the bulk being held at vendor and retail locations. The vendor could possibly retain ownership, regardless of inventory location, until demand is generated.

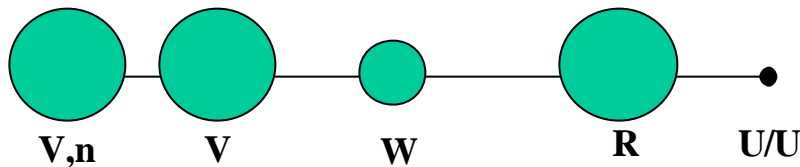


Figure 20: Inventory Rationalization (Critical)

Rationalization of inventories in accordance with the Quadrant Model, as described above, results in an inventory posture that improves responsiveness to meet customer demands while simultaneously achieving maximum cost savings and efficiencies. See Figures 23 and 24.

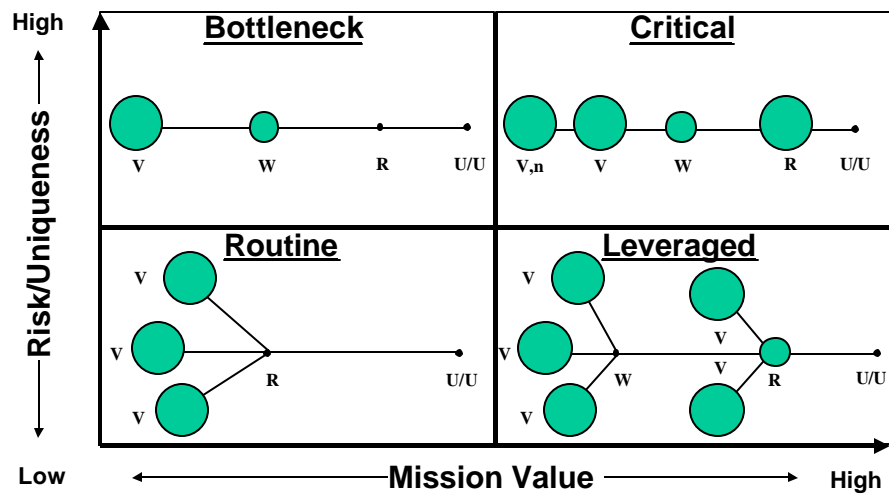


Figure 21: Inventory Rationalization (Quadrant Model)

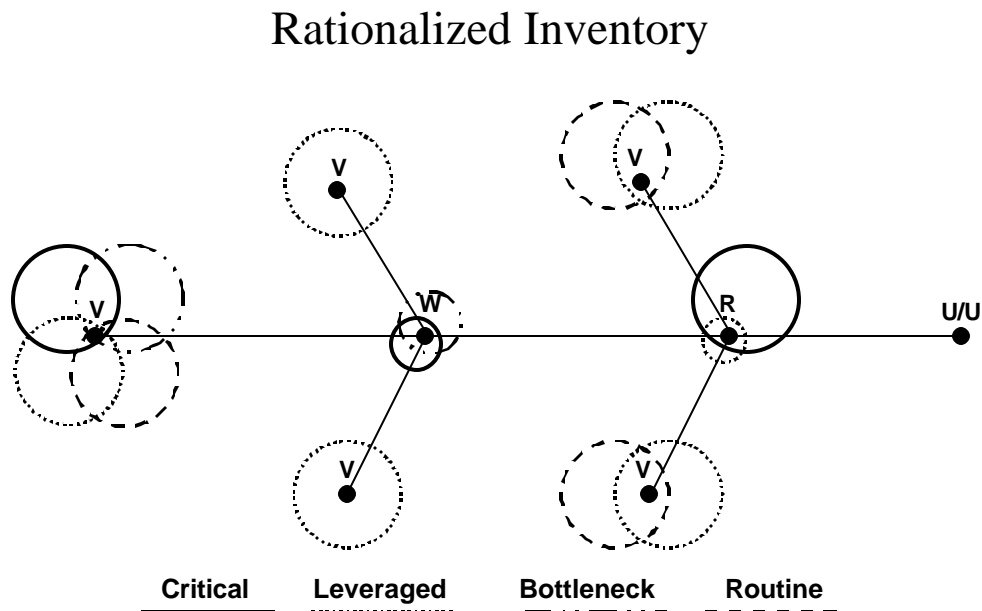


Figure 22: Inventory Rationalization (all Quadrants)

SUMMARY

This chapter was designed to redefine the Quadrant Model and related concepts within a framework for the USMC. The chapter focused initially upon the materiel attributes of value and risk and a necessary requisition for segmentation of materiel items in the Quadrant Model. Next, an overview was provided of the need for different supply chain approaches, when using the Quadrant Model. Finally, vendor relationships and materiel management were analyzed using the Quadrant Model and supply chain to analyze necessary changes. The next chapter will focus upon the application of the Quadrant Model in the USMC in terms of specific areas such as doctrine, policy, processes and operations.

CHAPTER 4

CONCEPT FOR APPLICATION OF QUADRANT MODEL

INTRODUCTION

The previous chapter provided insights for redefining the Quadrant Model from a commercial to a military context. This chapter discusses the operational setting (environment) where the Quadrant Model will function, identifies considerations when applying the concept, and develops a concept of operation to implement the Quadrant Model in the Marine Corps.

Operational Environment

Too often, logistics modernization initiatives are developed in peacetime and optimized to a garrison environment. This is understandable, given that, in terms of time and scope, the bulk of the logistics enterprise is conducted in an environment where bullets are not flying. Also, in times of peace, much of the motivation for improvements is driven by budget, politics, and other influences that become less relevant when Marines (our ultimate customers) are placed in harm's way. There are many instances where processes and systems that function perfectly well during the time providers and customers are in garrison must later be modified or scrapped when units are deployed. If the Quadrant Model were only relevant in the less demanding scenario, its benefits would be limited. In fact, the Quadrant Model's benefits are particularly relevant to deployed operations.

By distinguishing and managing those items that are truly high value to the customer from those that are not, and by rationalizing inventories to locate those high value items as close to the customer as possible, the USMC will ensure that local stocks on hand from which blocks are constructed to support deployments are already largely pre-tailored to meet mission requirements. Additional items required for deployment block(s) will be procured as appropriate: routine and leveraged items primarily from local sources and critical and bottleneck items through their respective managed supply chains. As the deployment unfolds, the supply chain upstream from retail inventories (including vendor relationships, distribution networks, etc.) will have been optimized to ensure maintenance of sustainment flows.

Today, the requisition prioritization process is routinely "gamed" by some less scrupulous customers to the detriment of all, especially in large-scale deployments where transportation and distribution resources are at a premium. Incidents abound of one organization's weapon system deadlining parts waiting on a shipping dock while another's special services equipment or other lower priority items (as defined by the Quadrant Model) are loaded and shipped. The Quadrant Model imposes a built-in priority discipline that helps protect against any self-serving group's manipulations. Within a given force activity designator (FAD), unless excepted by proper authority, critical and leveraged items competing with routine and bottleneck for scarce transportation resources would always ship first, regardless of the priorities used by requisitioning units.

Not only will operating inventories and their upstream supply chains be shaped by the quadrant, war reserve materiel (WRM) inventories will be rationalized as well. WRM is

insurance to ensure availability of high value items in time of war when demand may surge and supplies may not be sufficient to ensure fulfillment of the demands. Currently, war reserve materiel requirements (WRMR) are calculated for all high value products and, within funding constraints, WRM is procured with little regard to risk. Management of WRM under the quadrant concept would result in a dramatically restructured inventory posture. By definition, WRM includes those products that would fall in the critical and leveraged categories. For deployed forces, two factors militate against an item's being available when needed: It can't be manufactured rapidly enough or it can't be transported to its place of use/consumption rapidly enough. In the case of critical products, the challenge is manufacturing enough of the product to meet the surge in demand. For leveraged products, the market is capable of manufacturing sufficient quantities; the issue is, rather, transporting sufficient quantities to the area of consumption. WRM stocks should be shaped, then, to meet the expected fulfillment challenge.

Critical products should be stocked in WRM to ameliorate the supply chain's inability to manufacture enough of the product to ensure continued fulfillment of demand. In some instances, for highly critical items, the production capacity may remain far below anticipated demand for the duration of the operation. For those items, quantities in excess of the current 90-day acquisition objective should be procured and stocked. Conversely, the industrial base, at quantities far in excess of even surge demands, can manufacture leveraged items. The challenge is not making enough; rather, it is transporting enough leveraged items to the point of consumption. Leveraged items should be stocked in WRM in much lower quantities, essentially only enough to accommodate the initial surge at the beginning of a deployment while the commercial market adjusts production capacity to accommodate the surge in demand. Over time, the distribution capacity into the theater of operations matures and becomes more robust. With WRM rationalized by the Quadrant Model, the resupply pipeline will remain filled by critical items from WRM stocks and leveraged items from the commercial market to ensure uninterrupted fulfillment of high value demands.

APPLICATION CONSIDERATIONS

Now that the operational setting where the Quadrant Model will function has been discussed the following section addresses many of the issues and considerations associated with successful implementation of the Quadrant Model in the Marine Corps. We have purposely selected doctrine, policy, processes, and operational terms as a means to help define the Quadrant Model in terms of Marine Corps and Department of Defense materiel management.

Doctrine

Implementation of the Quadrant Model within the Marine Corps represents an evolutionary step in the logistics transformation process. In order to facilitate the institutionalization of this business practice within the Marine Corps, logistics doctrine must be updated to reflect the advantage of using the Quadrant Model to streamline materiel management, procurement/contracting, and acquisition logistics processes. Use of a business practice, such as the Quadrant Model, tailored to help fulfill Marine Corps logistics requirements provides a tangible example of how the USMC intends to leverage best business practices and innovation. The Marine Corps Combat Development Command (Doctrine Division)-sponsored

doctrinal publications noted below serve as a reference point that should reflect this new USMC logistics concept. An accelerated DOTES (Doctrine, Organization, Training/Education, Equipment/Facilities, and Support) assessment of the following Marine Corps Warfare Publications (MCWP) is required to facilitate institutionalization of this concept:

- MCWP 4-1 (Logistics Operations)
- MCWP 4-11 (Tactical Level Logistics) series
- MCWP 4-12 (Operational Level Logistics: in development)
- MCWP 4-13 (Strategic Level Logistics) series

Policy

Policy, unlike doctrine, provides more definitive guidelines and procedures on the methods to execute the overarching process or practice. Marine Corps policy is documented in a number of fashions but most commonly in the form of Marine Corps directives (e.g., orders, manuals, etc.). Since the Quadrant Model is an overarching “logistics” concept concerned with functional areas such as materiel management, distribution, procurement, etc. Marine Corps policy spanning the full spectrum of logistics functions must be reviewed and updated as appropriate. In general, Marine Corps Orders, User’s Manuals, etc. in the standard subject identification code 4000 series should be reviewed for applicability of this emerging logistics concept and updated as required. For example:

- MCO P4200.15, Purchasing Procedures Manual
- MCO P4400.39, War Reserve Materiel (WRM) Policy Manual
- MCO P4400.79, Provisioning Manual
- MCO P4400.82, Regulated/Controlled Item Management Manual
- MCO P4400.150, Consumer Level Supply Policy Manual
- MCO P4400.151, Intermediate Level Supply Management Policy Manual
- UM400-15, Organic Property Control
- UM 4400-124, SASSY Using Unit Procedures
- Marine Corps System Command’s Acquisitions Handbook
- Marine Corps Order (DRAFT) on Contracted Logistics Support (CLS)

Likewise, Department of Defense Directives (DODD) such as DODD 5000.1, The Defense Acquisition System, and other related policy documents such as Service acquisition handbooks should be reviewed for inclusion of this new concept.

Processes

Many of the current acquisition, procurement, and materiel management processes in the Marine Corps are stove-piped or managed in an aggregated manner. This methodology flies in the face of supply chain theory and practice in the commercial sector. The Quadrant Model represents a reengineered approach that seeks to allocate resources based on a cross-enterprise and total logistics landed cost basis.

Implementation of the Quadrant Model within the Marine Corps will result in a number of significant benefits. From a business process standpoint, this rationalized approach to materiel management follows defined process maps based on the particular materiel's risk and value to the organization. This approach contrasts with the current Marine Corps process whereby all materiel is generally grouped together and requisitioned according to one standard procedure. By using the Quadrant Model the Marine Corps will have distinct supply chains based on the product's location within a particular cell of the model.

Process improvements must be made before or as the Quadrant Model is placed in operation throughout the Marine Corps. These process changes are a precursor to the Marine Corps taking advantage of the enormous implications that the Quadrant Model implies to the way the Marine Corps currently conducts business. First, new vendor strategies will have to be developed and implemented to fully realize the potential of this new approach. Second, the procurement process will have to be re-engineered along with other processes. Third, as a result of process changes, organizational structure as well as roles and responsibilities of personnel will have to be evaluated, skill gaps measured, and training and development programs initiated. In order to fully realize the full potential of benefits that the Quadrant Model espouses an information technology solution must be developed, tested and fielded. The foregoing actions will require an investment of resources to facilitate implementation in a timely, thorough manner.

Operational Terms

In operational terms, the Quadrant Model concept design is such that environmental factors (i.e., deployed versus peace time or garrison operations) are minimized with regard to the effectiveness of the process. Therefore, the benefits inherent in the Quadrant Model process are equally applicable in all military settings, which provide a strong affinity for adoption within the Marine Corps. Of all the many benefits of using the Quadrant Model, the following three areas appear to provide the greatest return on investment:

- **Materiel Management:** The Quadrant Model provides a rationalized approach to materiel management that facilitates:
 - Changing the paradigm of where inventory is located
 - Improving the information technology and business processes that effect the way materiel is processed throughout the USMC
 - Reducing the days of safety level and order ship time
- **Procurement and Contracting:** The Quadrant Model provides a decision support tool that facilitates effective, efficient procurement of products and services via:
 - Improving procurement decision-making
 - Reducing transaction costs
- **Acquisition Logistics:** The Quadrant Model provides a framework that facilitates life cycle management via:

- Tailoring logistics/supply chain strategies in consonance with acquisition objectives
- Identifying, developing, and maintaining relationships with vendors appropriate to the value and risk of the acquisition

Benefits

We have just described many of the impacts that implementation of this concept will have on the USMC. Once the issues previously noted have been addressed and implementation of the Quadrant Model takes seed the advantages will begin to grow. The following section describes many of the benefits that the Marine Corps will gain as a result of using the Quadrant Model.

In the past, attempts to improve responsiveness to customer demands have often been achieved at the expense of efficiency, as illustrated by the “iron mountain” of layered inventories and associated resource expenditures inherent in current practices. Conversely, greater efficiency in managing materiel has sometimes been accomplished at the expense of responsiveness. Segmenting product lines within the Quadrant Model offers the potential for the USMC enterprise to improve both areas simultaneously and in complementary fashion.

Readiness

Within the quadrant methodology, scarce resources (manpower, money, time) are focused on intensely managing those products that really matter to the customer and for which the commercial market does not, by its nature, ensure a high probability of timely delivery, high quality, etc. (critical products). By understanding the supply chain for this particular product line, and by managing the *supply chain* versus simply managing the product, appropriate relationships will be established with vendors whereby all parties work collaboratively to ensure uninterrupted support to the customer. Also, by targeting performance measures that are externally focused, i.e., customer driven, in those intensely managed product lines, the USMC will be better able to assess its degree of success (and the success of the supply chain) and adjust resources, practices, and relationships as necessary to continually improve. Simultaneously, by expanding access to and reliance on the commercial marketplace for products of which the market itself ensures a ready supply, the organization will improve responsiveness to its customers. No single vendor (or group of vendors), whether the government itself or agents acting on its behalf, can ever hope to equal the highly competitive commercial marketplace. The government’s management resource expenditures will focus primarily on monitoring the marketplace to manage risk; in other words, to ensure that the market capacity for products upon which it depends (leveraged) does not shrink to the point of a product becoming critical without the USMC being aware.

Efficiency

The Quadrant Model provides the framework for the government to identify those product lines where the commercial market is inherently responsive to the customers’ needs, and tailor its management practices and expenditure of resources appropriately. For routine products,

there is little motivation to “manage” the product at all. Figure 31 is an extract from Appendix A of the USMC’s *“Integrated Logistics Capability (ILC) Case Study”* conducted October 1998 - February 1999. It is the most comprehensive study to date on cost saving potential to be achieved by implementing the Quadrant Model. The data reflected in the chart are a conservative estimate of savings to be derived solely from rationalization of existing inventories. The details of the analysis are available on the ILC Web site at www.hqmc.usmc.mil/lpi.nsf. The savings and reinvestment potential to be gained in manpower and time has yet to be quantified but is expected to be significant.

Risks

The implementation or introduction of any decision tool or system is never without certain risks. Change begets variation; variation, gaps in momentum, understanding, and acceptance. The following four areas represent risks that must be addressed to increase the likelihood of successful implementation of the Quadrant Model in the Marine Corps.

- Overzealous application
- Defensive posturing
- Shifts in supplier relationship expectations
- Inconsistent categorization

An overzealous application of the Quadrant Model would clearly result in the re-categorization of some critical items to some lower level cells, meaning that either risk had been underestimated or mission value downgraded. The impact on the USMC would be an unacceptable reduction in readiness.

The potential for such eventuality is nearly negligible, however, given that most individuals tend to be change-resistant, thereby suggesting that there is a greater potential for too few items being properly reassigned to lower level quadrants. Moreover, experience has repeatedly demonstrated that when such changes are being undertaken, distrustful or skeptical users will try to temper the potential impact on their risks by building their own inventory caches “just in case.” Such actions may compromise the effectiveness of the Quadrant Model as well as create a chaotic environment that will appear as a highly inconsistent, yet partial, implementation.

Shifts of items from one quadrant cell to another, as the result of implementation, will have far-reaching implications for supplier relationships and distribution variations. On the one hand, suppliers may be subjected to different buyer behaviors than previously, meaning that they need to become fully aware of the actions being undertaken by the USMC with this implementation. Also, items that had been ordered and inventoried less than one philosophy may, at least in the short term, appear to be in an overstocked situation, thereby dictating a momentary cessation of ordering. (Note that understanding the current USMC business practices, no items are expected to be reclassified into higher value/higher risk quadrant cells.)

Inconsistent categorization may occur when (a) the business rules are not sufficiently clear that a particular individual might classify similar items differently, or (b) when multiple individuals might classify the same item differently. Developing precise rules as well as effectively training all responsible persons can overcome these problems.

All of these risks may be substantially overcome through (a) establishing precise classification rules, (b) extensively and effectively training acquisition development, procurement and contracting, and materiel management personnel, and (c) disclosing to suppliers, in a timely and accurate manner, that the way in which the USMC does business is undergoing substantial change.

Up to this point our discussion has been largely conceptual and has focused on the benefits and risks associated with using the Quadrant Model. The following section of this chapter continues to add rigor to the concept and provides a framework that may be used by the Marine Corps to implement this best business practice.

CONCEPT OF OPERATIONS

PURPOSE

The purpose of this concept of operations (high-level implementation plan) is to delineate the required actions that must be accomplished to move the Quadrant Model initiative from concept to reality for the Marine Corps. This document is the starting point for subsequent project managers to execute the next steps of this initiative. Starting with an overview and general program objectives, it discusses the strategies for implementation and institutionalization, identifies roles and responsibilities, and lists key events necessary to support the vision and objectives of this initiative. Overall management of this initiative is broken into four tracks with a series of tasks under each track.

QUADRANT MODEL IMPLEMENTATION OBJECTIVES

The Quadrant Model implementation objectives define how the Marine Corps will accomplish transformation activities to support the improved paradigm. Executing these strategies relies upon proper resourcing, the use of project planning tools, and supporting methodologies.

A specialized core team formed from a strategic alliance between MCCDC, MARFORS, MATCOM and other process owners, partnered with academia and commercial industry must be assembled to manage and accomplish initial implementation and subsequent institutionalization of the Quadrant Model initiative. This team is required immediately and is considered to be key for streamlining processes associated with the Quadrant Model initiative.

- Quantifiable quick wins emerging from proof of concept applications and pilot tests must be realized. This objective provides momentum, is an effective enabler of the change process, and quantifies the savings anticipated from improved paradigms and realigned inventory management policies.
- Effective management of policy and procedure changes is key to program success. These best practices must be integrated into Marine Corps doctrine and policy to ensure that these concepts transcend the Quadrant Model Initiative. Failing to accomplish this places the Initiative at a disadvantage, since all other changes are driven by these activities.

CRITICAL SUCCESS FACTORS

Instituting the actions identified in this paper will require assertive, focused and innovative approaches toward this new way of doing business. In some cases, institutional inertia and professional parochialism may present significant challenges and barriers to implementation of the Quadrant Model in the Marine Corps. The critical success factors noted below are those items, which must be accomplished for the Quadrant Model initiative to be successful.

Meet Customer Requirements : The Quadrant model implementation should be able to meet customer requirements by streamlining the acquisition, contracting/procurement and material management processes. Hence it will become necessary to plan, develop and execute pilot projects that will have a very visible impact while addressing the above-mentioned issues.

Organizational Familiarization and Support: Any successful implementation of the Quadrant model will necessarily need the support of all key decision points within the Marine Corps. In order to fully realize the benefits of the Quadrant model it has to be incorporated in the Combat Development System (CDS). Moreover the Marine Corps will have to work continuously with the DOD/GSA in order to get wider acceptance of the Quadrant model. And finally the Marine Corps should be able to convince DOD to permit the Marine Corps to reinvest savings from the implementation of the Quadrant model in further streamlining the acquisition/procurement/material management process.

Measurement : Early on in the implementation process metrics have to be developed to track, report, evaluate and make the changes (as required) in the pilot programs. This will lessen the possibility of making mistakes during the period of full implementation. Also while implementing the pilot projects it will be advisable to take a combination of pilot projects with different levels of difficulty in the change implementation process. Moreover data sharing and information availability across functional applications must be emphasized in order to integrate logistics strategy and applications.

Information Technology Support Structure : Information technology plays a critical role in business process improvements because it gives access to data that enables decision makers to make informed decisions. The implementation of the Quadrant model will require greater visibility of information throughout the supply chain so that the Marine Corps can make the transition from an inventory-based to a distribution-based model.

Execute Aggressively: In order to facilitate successful implementation following an aggressive approach to execution is required. First, metrics should be developed to evaluate success of the Quadrant Model through the pilot program and full implementation. Second, data sharing and availability across functional applications should be applied. Thirdly, integrate the Quadrant Model concepts into the acquisition process. Fourthly, streamline the acquisition processes for development or procurement of information systems. Next, instruct Marine Corps contracting offices and work with other services contracting offices to make the Quadrant Model happen, specifically in terms of long term vendor relationships. Lastly, ensure that the Marine Corps supply functions and USMC/DOD distribution functions are aligned in order to allow us to move from an inventory-based to a distribution-based replenishment model.

IMPLEMENTATION CONCEPT

In order to apply the Quadrant Model within the Marine Corps there are a number of issues and factors that must be addressed to maximize the opportunity for successful implementation. The following concept of operations for application of the Quadrant Model within the Marine Corps provides what we believe is the best solution based on a holistic approach (e.g., complete, suitable, feasible, etc.).

- **Implement Using a Phased Approach.** Employing a phased approach serves to build on momentum, reduce risk, and allow for incremental changes (course corrections), as required. We recommend a three-phase approach to implement the Quadrant Model within the Marine Corps consisting of the following:

Development Phase

The high-level implementation strategy outlined below is sequenced in general order of logical precedence. In some instances, general dependencies exist; i.e., one event must be completed before another. This does not necessarily mean that one must be completed before another begins, as considerable overlap of activities may exist. The degrees of dependency and concurrency must be ascertained by developing a detailed plan of action and milestones (POA&M) for implementation. Testing and evaluation should occur throughout the process. Also, financial management and accounting procedures will have to be adjusted at each step along the way to accommodate the changed approach. Moreover, at appropriate points, interim policy and procedural changes must be published. The value/risk attributes of any product/item determine its placement in the Quadrant Model and drive the characteristics of supply chain structure, vendor relationships, inventory management practices, etc. Consequently, any implementation of the Quadrant Model must begin with the development/refinement of criteria for categorizing products. A recommended approach for developing “winning battles” product criteria has been recommended in this document. An immediate effort to validate/refine that approach should be initiated. In the area of “making Marines” (the transformation process), some equivalent methodology should be identified or developed.

A cataloguing methodology must be developed that, ultimately, at full implementation, will provide the rules/procedures for applying the materiel attributes criteria to all existing and new products used/consumed by the USMC. Within the POA&M, a course for achieving that end state should be recommended. Options may vary from cataloguing one class of supply at a time to selecting “slices” of all or a group of supply classes to be implemented simultaneously.

Materiel management performance measures and metrics must be developed with regard to the above steps in order to assess the impacts that will result when the USMC begins to actually make adjustments in operating procedures. At this point, baselines should be determined so that comparisons between old and new practices can be made.

Pilot Program Phase

Once the above efforts are sufficiently developed, physical implementation of the Quadrant Model may commence. Rationalization of existing inventories is the logical start point. The large investment the government has made in acquiring and managing those inventories means that (a) the potential immediate return in cost savings and cost avoidance is significant, and (b) it is the area in which the most immediate initial assessments can be made regarding issues such as responsiveness to customer demands. Finally, relative to the other logistics application areas, such as acquisition/development and procurement and contracting, it has fewer externally imposed statutory and regulatory requirements. Changes in this area will be

easier to initiate as well as to adjust following testing and evaluation. Successes achieved in this phase can also assist in building wider buy-in for follow-on steps. Early on, those inventories that have the least potential for disrupting ongoing operations, particularly within the operating forces, should be the focus (stores held PWRM, etc.).

At the same time, or possibly before rationalization of inventories is begun, acquisition/development objectives can be further developed and refined. From that, appropriate vendor relationship strategies can be derived. Materiel management and acquisition/development must be closely integrated activities; however, they are sufficiently discrete in their sub-processes that different, although complementary, performance measures must be developed for each. At this point, acquisition/development performance measures and metrics should be developed.

Subsequently, the USMC can commence adjusting acquisition/development activities to conform to the Quadrant Model. In a phased manner, vendor relationships can be adjusted and supply chains developed and/or modified. New distribution strategies to optimize the revised vendor and supply chain constructs can be created.

Institutionalization Phase

Throughout the step-by-step process outlined above, continual testing/evaluation as well as base-lining and measuring, decision points, and other validation and refinement steps must be inserted to ensure successful completion and ultimate USMC implementation of the Quadrant Model. The HQMC will recommend for DOD wide application. Simultaneously training and education of all personnel who will use the Quadrant Model will have to be carried out. At the same time, both within and outside the DOD, new “best practices” will be emerging. The USMC must ensure that it stays actively engaged in that evolution (some would describe it as a revolution) and does not become so possessed with fully implementing this business practice that it fails to recognize and capitalize on others as they may be identified.

ORGANIZATIONAL ROLES AND RESPONSIBILITIES

Clearly defined roles and responsibilities are critical to defining the execution boundaries for the Quadrant Model initiative and producing a coordinated effort that can be managed by a strategic alliance between key stakeholders (noted below). These roles and responsibilities identifying the various program elements and responsibilities for the timely and efficient completion of tasks.

- **HQMC/MCCDC/MARFORs/MATCOM establish and maintain a strategic alliance.**
 - ❑ Identify the range and depth of resources necessary to accomplish the Quadrant Model initiative.
 - ❑ Manage and validate the Quadrant Model initiative through an accelerated DOTES assessment.
 - ❑ Develop logistics IT solution(s) for implementation of the Quadrant Model.

- ❑ Facilitate the establishment of organizational relationships required to create the pilot site.
 - ❑ Serve as the Quadrant Model initiative spokesman and accomplish the ILC communication plan.
 - ❑ Serve as the community advocate for the Quadrant Model initiative and demonstrate the concept utility for improved materiel readiness and life cycle management.
 - ❑ Coordinate, under HQMC lead, all activities of the primary project tracks (information technology, policy/procedure changes and organizational reform).
 - ❑ Present the efficiencies of the Quadrant Model initiative to the Marine Corps leadership.
 - ❑ Serve as a custodian of lessons learned from the Quadrant Model initiative.
 - ❑ Apply this best business practice identified by the ILC Initiative to enhance materiel readiness.
 - ❑ Enhance the SCOR Model, developing an integrated Marine Corps Logistics Operations Reference Model.
 - ❑ Execute necessary policy and procedure revisions for the Quadrant Model initiative.
- **MATCOM/MARCORSYSCOM accomplishes acquisition planning, assesses opportunities for improvement to life-cycle management and streamlines the process to satisfy information technology requirements and other technology transfer activities.**
 - ❑ Identify information technology transfer requirements and supporting personnel qualifications necessary to sustain the Quadrant Model initiative.
 - ❑ Develop a data strategy for the Quadrant Model initiative.
 - ❑ Accomplish streamlined and accelerated acquisition activities required to meet the objectives of the Quadrant Model initiative.
 - ❑ Develop life-cycle management strategies and procedures for logistics information systems to include technical transfer strategies, divestiture strategies and data standardization strategies using commercial best practices.
- **HQMC (Installations& Logistics) provides coordination of the Quadrant Model initiative, as required.**
 - ❑ Provide subject matter experts to enhance and support the Quadrant Model initiative.
 - ❑ Provide high-level metrics from other DOD initiatives for comparison/validation of the Quadrant Model initiative changes.
 - ❑ Execute infrastructure and transportation policy and procedure revisions for the Quadrant Model initiative.
 - ❑ Initiate requests for revision of any statutory requirements that would hinder the Quadrant Model initiative (e.g., procurement, etc.).

- **HQMC (Programs and Resources) provides necessary PPBS support required for Quadrant Model implementation**

- Provide required funding for implementation/institutionalization of the Quadrant Model

NEXT STEPS

The Quadrant Model initiative provided a structured, disciplined, and focused approach to the materiel management decision-making process by rationalizing inventory on the basis of its relative mission value and risk to the organization. In order to maximize the opportunities and benefits of this new approach to the way the Marine Corps conducts business, the following recommendations are outlined below.

- Conduct interviews per Phase B of this project in order to identify, document, and catalog the most current lessons learned with regard to implementation of the Quadrant Model within a commercial context. The purpose of Phase B is to leverage commercial industry's best practices (lessons learned) from both a positive (exploit) and negative (mitigate, minimize or eliminate) perspective.
- Identify subject matter experts (SME's) that potentially will participate in the Phase C workshop conducted by SAPIENT Corporation. This group of SME's would ideally be a high level, cross-functional group of USMC stakeholders with a vested interest in the implementation of the Quadrant Model. To this point, the preponderance of expertise and level of support provided to the formation of this concept is from the materiel management area. In order to maximize the opportunity for successful implementation throughout the Marine Corps, as well as optimize the benefits of the Quadrant Model, stakeholder involvement (e.g., understanding of the model; identification of challenges and potential solutions that will facilitate implementation of the model, etc.) is required. All SME's should be provided with the Phase A documentation for their internalization and edification in order to facilitate a level playing field of knowledge. Functional areas that we believe must be represented on this group to optimize and institutionalize the Quadrant Model process in the USMC include (but are not limited to):
 - Acquisition
 - Distribution (Transportation and associated functions)
 - Finance
 - Materiel Management
 - Procurement (Purchasing and Contracting)
 - Conduct research around policy and procedures relating to stock levels for classes of supply. The information collected must be in a ready-to-use format, as specified by SAPIENT personnel.
 - Identify potential pilot project programs for implementation of the Quadrant Model, for example, initial issue provisioning (IIP) stock or war reserve materiel.
 - Review and resolve "parking lot" topics.

This chapter has identified a path or axis of advance to implement the Quadrant Model with the Marine Corps. Those issues identified as critical success factors, in conjunction with thoroughly coordinated effort, must be embraced to successfully accomplish the objective of institutionalizing this concept. The following chapter discusses business rules and identifies a set of high-level business rules applicable to implementing the Quadrant Model in the USMC.

CHAPTER 5

HIGH LEVEL BUSINESS RULES

Many organizations in the commercial sector have developed an increased interest in Business Rules during the last two decades. This interest has been fostered by a number of compelling reasons including:

- An accelerated rate of change which requires businesses to be more agile and flexible while maintaining internal integrity of their information and operating systems.
- Now technology which provides opportunities to focus more on data integrity, decrease cycle times and improve responsiveness and efficiency.
- Higher-level automation systems, which minimize time for training and maximize the need for flexibility in the use of human resources.
- Reengineering of workflows and processes to streamline operations that allow user interaction to occur seamlessly.

As indicated above, the development of a set of business rules for the application of the Quad Model is useful from two perspectives. From an organizational perspective, business rules provide a logic that controls, guides, and/or enhances behavior related to applying the Quadrant Model. From an automation perspective, business rules can provide a formal approach that will provide rigor in producing standardized, executable and reusable process code. Documenting and automating specific business rules can provide a bridge between business processes and information technology. The focus in this section of the paper is upon the behavior perspective.

In the past the Marine Corps frequently used an approach that sought to leverage the size and corresponding influence of the defense enterprise. Yesterday's Marine Corps emphasized the concept of mass, where it was thought that the force with the "*most stuff*" would win over defense establishments not as well financed. This concept was further ingrained in the aggregated approach to the way that much materiel was procured. If the materiel was associated with a major weapons system or the item was available in the local department store, such as office, medical or general automotive supplies, there was very little difference in the purchasing approach. This method may have worked well in the past but today's budget environment and our future adversaries will not likely allow the build up of "iron mountains" whether in warehouses during peacetime or deployed during the early stages of conflict intervention.

With the advent of the Quadrant Model the Marine Corps has found a tool that facilitates the convergence of the vision for Marine Corps logistics with supporting business concepts and processes. The Quadrant Model acts as a filtering process that helps to stratify products and services according to those characteristics that most effect materiel readiness. This new way of thinking takes advantage of commercial business practices which further help to fulfill meeting the principles of logistics support identified in Marine Corps Warfare Publication 4-1, *Logistics Operations* (i.e., responsiveness, simplicity, flexibility, economy, attainability, sustainability, and survivability) albeit to greater or lesser degrees depending on the particular principle. In an effort to streamline and standardize the process of categorizing and assigning materiel within the Quadrant Model the use of business rules serve as a mechanism to complete this function. In

addition, establishing, documenting, and automating business rules serves as a bridge between business processes and information technology solutions.

The following assumptions were made in developing the business rules in this section:

- The Marine Corps is the only part of the US Armed Services considering adopting the Quad Model at this point in time.
- The Department of Defense is not actively pursuing a segmentation approach to supply based upon the Quad Model.
- Business rules will be further developed and refined in Phases B, C, and D of this project.

The following high-level business rules are recommended to help further develop the Quadrant Model for the implementation in the USMC:

General Business Rules:

- A refined segmentation methodology must be developed that will apply to garrison and deployed operations.
- The refined segmentation criteria must apply to all NAN's controlled by the USMC (existing and new items).
- Mission value analysis for cataloging/segmenting materiel items, must be based upon value to the total USMC enterprise in terms of "Winning Battles".
- Risk analysis for cataloging/segmenting materiel items must be based upon item availability and quality as dictated by the nature of the supply market.
- Consideration must be given to whether the cataloging/segmentation will be undertaken for one class of supply at a time or should slices of all or several supply classes be evaluated simultaneously.
- Materiel Management performance metrics must be developed and base lines determined to measure the difference between the "as is" state and the "to be" state.
- Once the cataloging/segmenting criteria have been sufficiently refined, attention should be focused upon the materiel management area and, specifically, existing inventory must be rationalized.
- Once inventory has been rationalized, vendor relationships can be adjusted in accordance with the guidelines outlined in Chapter 3.
- Finally, appropriate changes can be made in acquisition logistics and procurement/contracting based upon the changes in materiel management (inventory rationalization and vendor relations).

Quadrant Specific Business Rules for Managing Procurement, Acquisition and Materiel

Routine Items:

- Simplify the acquisition process
- Reengineer procurement to reduce overall level of effort
- Minimize administration effort and related cost
- Automate processes
- Emphasis should be upon total cost of using vendor related transactions.

Bottleneck Items:

- Eliminate bottleneck items and /or ensure their continuity of supply
- Decrease product uniqueness
- Manage for supply continuity
- Develop competition among suppliers
- Utilize penalties and incentives to drive performance of supplier

Leveraged Items:

- Maximize market position
- Concentrate volume
- Maintain competition
- Continual market assessment
- Maintain flexibility with requirements
- Focus upon lowering supply chain cost
- Focus upon price and delivery time of vendor
- Collaborate with vendor when useful

Critical Items:

- Strive for high value-added relationships and for innovation
- Use expertise of selected vendors to improve supply chain effectiveness
- Coordinate internal linkages with vendors to improve communication
- Share risks and rewards
- Focus upon total value and performance

Business Rules For Item Introduction and Sustainment

Implementation of the Quadrant Model will significantly impact acquisition/development, procurement and contracting, and materials management. These activities can be divided into two distinct operating time frames: item introduction, as when acquisition/development is determining a specific need, or when procurement and contracting is engaging suppliers; and sustainment, where materiel management controls stock locations and levels.

Using the descriptions/definitions developed for the military applications of the Quadrant Model discussed earlier, the following key, or high-level, business rules were derived:

1. At item introduction, acquisition/development, and/or procurement/contracting personnel should endeavor for a materiel solution that results in placement as close to the lowest-left corner of the quadrant as practicable.
2. During sustainment, materiel management needs to take actions to (a) maintain items in the lower left of the quadrant, and (b) move, whenever practicable, those items that may have been originally located in the upper right, farther to the lower left.

Summary

This section discussed business rules from three perspectives: general, quadrant specific, and application, involving item introduction and sustainment. This was a point of departure for further development in the next three phases of this overall project.

CHAPTER 6

DESIRED END STATE

INTRODUCTION

The desired end-state will be described on the assumption that the Department of Defense and other services will not significantly adjust their current policies and practices, and that the Marine Corps will implement the Quadrant Model. Under the Quadrant Model, as is the case today, MATCOM will be the end-item life cycle manager and materiel manager for the Marine Corps. In that capacity, it will apply Quadrant principles throughout all end-item life cycles and will manage the Marine Corps' supply chains for all consumable and non-consumable products.

Lacking revised Department of Defense cataloguing/ categorizing practices, MATCOM must establish a group within its organization to accomplish that process for all items/products used/consumed by the Marine Corps. Its personnel will have specialized training and experience in market analysis and will have Quadrant tools (to be developed) with which to accurately assign initial identity and classification of products based on information provided them by Program Managers/Weapon Systems Managers PM/WSM's and/or consumers. Moreover, they will also have processes and tools for reviewing and updating product classifications throughout their life cycle/use by the Marine Corps and their activities will be coordinated to ensure proposed "new" product requirements are vetted against existing classified products for substitutability, interoperability, etc. This group will work closely with Department of Defense PICA's and SICA's, as well as commercial vendors throughout this process.

The classification group is central to Quadrant Model implementation and operation in acquisition/development, materiel management, and procurement and contracting. Aside from actual development of the Quadrant classification process and tools, establishment of this group will be the single largest investment to be made by the Marine Corps in implementing the Quadrant concept. Most other significant changes will be limited to the development and publication of new/revised policies and procedures.

ACQUISITION/DEVELOPMENT

MCCDC will adjust the combat development process to include guidelines for determining mission value of weapon systems and their major components/sub-assemblies in determining requirements. When a requirement is passed to SYSCOM for solution development, they will determine the element of risk relative to the MCCDC developed mission value which, in turn, will determine the weapon system/end-item Quadrant classification. MATCOM Program Managers will coordinate with the classification group throughout the development process. During the design stage, performance specifications and technical data of new systems designs will be reviewed by the classification group against existing product lines and market conditions to determine uniqueness and, therefore, risk associated with component sub-assemblies and parts. The classification group will identify and propose candidate products for possible substitution based on their review of the data. At the same time, vendors, in

coordination with the classification group, will be provided Quadrant guidelines and be incentivized to develop system lower risk solutions. They will be required to justify materiel solutions that fall within the upper (bottleneck and critical) cells of the Quadrant and be rewarded for finding solutions that fall within the lower (routine and leveraged) cells. The performance evaluation of the PM will need to be adjusted to reflect his/her success.

As the development process matures, the PM will develop supply chain characteristics for the end item, its components, and its parts, as a basis for developing inventory stockage criteria. The ratio of the sum of the data relative to the Quadrants will influence decisions regarding the level of contracted logistics support (CLS) and the nature of the vendor relationship(s) that will exist through the life cycle of the item (e.g., a system with a very high ratio of sub-assemblies and parts in the critical cell would be a strong candidate for some degree of CLS). In coordination with Procurement and Contracting, the PM will develop and finalize the type of post-fielding vendor relationship(s) to be established relative to the end-item, its components, and parts (Note: these may be different for each based on the classification ratios).

The initial issue provisioning (IIP) and initial pre-positioned war reserve requirements (PWRMR) determinations also occur in this process. Because of the nature of the vendor relationship for critical, military unique products, MATCOM will establish an enduring and collaborative relationship with such a vendor, one where, in accordance with the Quadrant concept, risks are mutually shared. A CLS-type relationship is likely here as well. In such a case, rather than Marine Corps purchase of IIP inventories, the vendor will be incentivised through the nature of the contract to carry the costs of building, owning and maintaining the IIP package, as well as subsequent inventories. Conversely, if the end-item has a large ratio in the lower cells (typical of a militarized commercial product), where an enduring relationship and CLS will be less necessary, the Marine Corps will buy and stock the IIP; however, only to the extent that it includes critical and bottleneck parts in the package. PWRMR will be calculated based on anticipated wartime consumption and the ability of the manufacturing base to meet the demand. Unlike today, where fixed acquisition objectives are established for PWRM, the stockage objectives will vary by item/product. If the wartime planning requirement assumes “x” days of consumption, the PWRMR will equal the aggregate calculated demand for that duration minus the change in production capacity to meet that demand. For some highly critical items the stockage criteria will have to be considerably higher than the current fixed acquisition objective. For leveraged items, it will be significantly lower.

Other Integrated Logistics Support (ILS) decisions that will be impacted by as well as impact the design of the supply chain with inventory (IIP and PWRMR) decisions reflecting the nature of the distribution network and storage facilities in the supply chain. For leveraged and routine items, the distribution networks and inventory storage capabilities of the vendors will primarily be relied upon. For critical items, either the PM must establish the capabilities or work with the vendor to do so on the Marine Corps’ behalf. Ultimately, the PM/WSM team will field the item for use in the Marine Corps. A similar but less complex process will be followed by non-developmental items/products introduced into the Marine Corps supply chain.

MATERIEL MANAGEMENT

MATCOM

In addition to developmental items, MATCOM's classification group will apply the Quadrants to reclassify products already in the supply chain with management practices adjusted accordingly. MATCOM will intensely manage a) the product, the vendor relationship and the supply chain for critical items, and b) the performance and customer response with its metrics and measures of effectiveness being outward/customer focused. It will oversee/conduct all SCOR activities within the planning category for the entire length of the supply chain, from customer to ultimate vendor of significance. Conversely, it will manage cost as pertains to routine items. Most planning activities that concern demand fulfillment of routine items will be conducted at the retail level as opposed to MATCOM and the LOG Bases, with MATCOM maintaining visibility, but functioning primarily in a "monitoring" capacity. For leveraged products, MATCOM will function in a similar monitoring role, with its principal interest being maintaining cognizance of market conditions as they affect product categorization.

MATCOM will establish inventory policy and stockage criteria that will be affected by the retail activities in accordance with Quadrant guidelines. It will also define the duration and nature of contracts entered into, whether at wholesale or retail levels, with regard to specific materiel, based on its classification. In coordination with the MARFORs and MEF's, MATCOM will identify for registration, the transportation requirements for Marine Corps materiel in support of CINC OPLANS. Requirements will be adjusted from current data based on actual assessments of deployment times and resupply criteria with emphasis and priority to products of high mission value. This, among other factors, will significantly impact the sustainment footprint of deploying forces while, at the same time, "front-loading" products of importance to mission success.

MATCOM will not only determine stockage locations and quantities based on Quadrant guidelines, but also determine inventory ownership based on the supply chain established for specific items. Even while it directs certain stock levels at retail locations, it may also arrange that ownership remain with the vendor(s) until the item is issued or used/consumed.

FSSG's

Retail activities, primarily the FSSG's, will stock products in accordance with MATCOM guidelines. Typically, the requisitioning objective for critical products will include operating levels and safety levels. Unlike today, both will be calculated quantities based on order ship-time, economic order quantities, and other demand-fulfillment-based criteria as opposed to fixed levels. Routine products will only be stocked at the FSSG inventory location only by exception. Operating stocks of leveraged products will be stocked at levels that are calculated rather than fixed. Bottleneck items will rarely be stocked at the FSSG's. The Log Bases, as directed by MATCOM will centrally stock bottleneck items.

FSSG's, with MATCOM oversight and guidance will be largely responsible for the SCOR planning activities as they relate to both leveraged and routine items. Performance

measures and metrics will be determined by MATCOM and applied universally by all levels of the supply chain based on Quadrant characteristics.

PROCUREMENT AND CONTRACTING

Procurement and Contracting personnel will be schooled in the objectives and benefits of the Quadrant Model methodology and will have an important role in assisting PM's in identifying and developing the appropriate contracting vehicle to meet the PM's vendor relationship requirements. They will also execute and manage contracts in accordance with MATCOM's materiel management guidelines based on the Quadrant cell location of the item(s) and the PM's vendor relationship. Even in the case of routine items, where the vendor relationship is said to be "transactional" they can assist by establishing Blanket Purchase Agreements (BPA's) and similar vehicles with a spectrum of vendors to ease the transaction processing at the retail level. Contracting officers will be more specialized than today, with the best trained and most experienced being used to develop and manage the long-term contracts inherent with critical items.

INTEGRATION

Application of the Quadrant Model will require the close coordination of all logistics functional areas to ensure an integrated approach to the classification and management of materiel and the development and maintenance of appropriate vendor relationships to ensure responsive customer support coupled with the best attainable efficiencies in the Marine Corps--from first use of a product to its retirement/discontinuation. Only the successful integration of these activities in implementing and employing the Quadrant Concept will assure the attainment of the anticipated benefits.

SUMMARY

This concept paper has (a) taken a commercial sector tool, the Quadrant Model, and modified some of its components for the military; (b) addressed its potential applicability; and (c) considered its impacts by identifying the benefits and risks associated with its application in the USMC. The Quadrant Model is a strategic concept executed at the tactical level in support of operational effectiveness and logistics efficiency. It applies a scalable approach for the procurement of items and services. The application of the tenets contained in this concept paper will be a catalyst for implementation of the principles of the Marine Corps Logistics Transformation/Logistics Campaign Plan.

The Quadrant concept takes advantage of innovations in commercial business practices to (a) enhance the logistics support to the warfighter, and (b) improve the efficient use of the resources allocated to the USMC. Implementation of the Quadrant Model has been demonstrated elsewhere to offer a comprehensive approach toward risk management, reducing logistics costs, streamlining inventories, and optimizing resources (personnel, time, and money). We envision a lean; more businesslike logistics support paradigm featuring improved materiel readiness as provided through reengineered processes. Moreover, we anticipate that implementation of the Quadrant Model will create a synergy among acquisition, distribution, procurement, and materiel

management functions that will help focus logistics efforts according to their value to the enterprise.

DOD enterprise-wide implementation of the Quadrant Model will provide the top-level support necessary to sustain the goal of focused logistics as described in JV 2010 and 2020. Potential benefits to the Marine Corps, however, is sufficient to warrant “going it alone” for the time being, if necessary. The rewards appear to be well worth the effort necessary for its adoption and implementation, with the hope that demonstrated success in the Marine Corps will extend its adoption. Ultimately, we believe that success will be measured by full adoption and implementation of the Quadrant Model throughout the Department of Defense through the Defense Logistics Agency and the other services.

APPENDIX A

QUADRANT MODEL: ACQUISITION, DISTRIBUTION AND METRICS

ACQUISITION

The Quadrant Model may be used to proactively manage the development of acquisition objectives. Recognizing the inherent differences associated with procuring a wide variety of products and services for use within the USMC, the Quadrant Model serves as a tool to allocate resources based on the relative mission value and risk associated with the acquisition. In this regard, the desired end state is to expend resources relative to their value. Furthermore, an objective tied to using the Quadrant Model is to recognize where a product or service lies within the model and potentially to reduce risk by developing sources, using commercial/performance specifications, etc.

During the life of vendor-customer relationships, each party continuously attempts to make modifications that enhance their own economic position. In general, these efforts are attempts to characterize the marketplace as having greater or lesser amounts of competition. Vendors expend significant effort to convince buyers and ultimate users that their product offerings are different from those of competitors and thereby worthy of higher prices. Conversely, buyers diligently seek out other potential vendors as well as work to modify specifications using commercial standards wherever possible in order to increase competition.

Routine

Acquisition/development objectives in the routine quadrant are characterized by taking advantage of existing product and service markets. Leveraging commercially available products and service, for example, facilitates uninterrupted order fulfillment and generally expends minimal resources. Generally, price is a factor because of the competitive nature of markets in this quadrant. However, vendors who are cognizant of the significant cost of executing transactions may seek to limit competition by offering exclusive systems that reduce order cycle times and administrative overhead costs for both firms (buyer and seller). The lower total cost of ownership to the buyer is offset by the reduced competition, which may shift the risk factor in the Quadrant Model.

Bottleneck

Leveraging existing commercial markets as well as developing additional sources in order to reduce the risk of stockouts characterizes Acquisition/development objectives in the bottleneck quadrant. Because products and services identified in the bottleneck quadrant have relatively low mission value, buyers may be more willing to risk the threat of a stockout by insisting that vendors maintain stocks within the supply chain (and paying for the cost of holding inventory). Similarly, the cost of products and services in the bottleneck quadrant may be a factor in acquisition/ development objectives because of the low mission value associated with these items. As an ongoing strategy, buyers often seek to reduce their risk by expanding the

number of approved suppliers, either through sourcing or by using commercial standards where practical.

Leveraged

Acquisition/development objectives in the leveraged quadrant are characterized by proactively and assertively managing the risk associated with the high mission value products and services. Since items in this quadrant are relatively low in risk/uniqueness and there are many sources/options, collaboration is a critical element to facilitate successful order fulfillment. Vendors can be assumed to desire a decrease in competition by attempting to increase buyer-perceived differentiation, thereby forcing items into the critical quadrant. Similarly, buyers will usually continue to offset such efforts whenever possible.

Critical

Acquisition/development objectives in the critical quadrant are characterized by efforts on the part of buyers to minimize risk and facilitate the uninterrupted procurement of the high mission value products and services. In the critical quadrant, acquisition/development objectives must be identified and managed using a win-win philosophy where price is almost never the primary driver. A collaborative, risk-sharing, profit-rewarding relationship between contractors and the government provides incentives to fulfill mission success. The costs associated with the products and services in this quadrant are related to attempts to maintain access to vendor technology and long-term collaborative activities, including joint research and development. Vendors typically are aggressive in their defense these relationships; however, buyers traditionally look for alternative vendors to increase competition. See Figure 23.

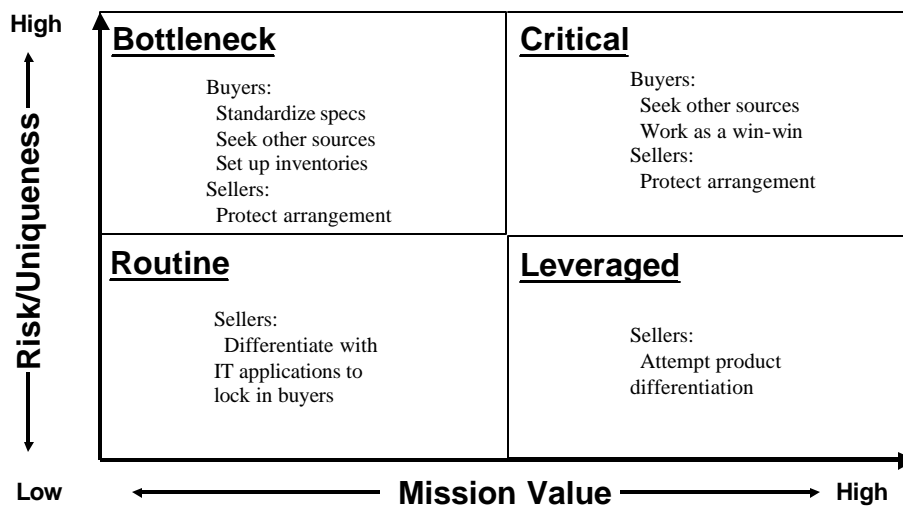


Figure 23: Typical Behaviors of Buyers and Sellers in the Acquisition Process

DISTRIBUTION VARIABLES

Distribution is the glue that holds the supply chain together. As part of the quadrant approach to materiel management, the distribution of products and services will be managed according to their mission value and risk/uniqueness. Increased availability rates, with decreased tolerance for average cycle times and variation in cycle times, drive high mission value materiel requirements for inventory plus the willingness to pay for premium transportation alternatives.

As a general observation, the number of nodes representing inventory locations as well as pass-offs from one mode to another or one carrier to another increases proportionately with mission value. As a collateral effect, the possibility for losing visibility of items in the physical flow increases as the number of nodes increases in the distribution system. Figure 24 below identifies distribution variables along a mission value continuum.

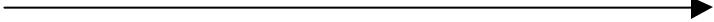
Materiel Distribution	
Mission Value	
	
Modes	Full load; partial load; premium delivery
Visibility	None; partial; ITV/TAV
Stock Location	Vendor; V/R; V/R/W; V/R/W/UU
Node	Minimal nodes, few nodes, increasing number of nodes
Cost	Cost very important; cost moderately important; cost not important
Supply Chain	Compressed; Robust

Figure 24: Distribution Variables Along a Mission Value Continuum

The level of management, attention, and effort will increase as relative risk and mission value increase. The increase in management will include greater information sharing, collaboration, level of duplicity, and visibility of throughput, transportation control, and credibility. During deployment, distribution channels will need to be more robust. The risk of temporary non-availability during a deployment may cause routine and leveraged items to migrate into higher risk categories.

Routine

Low risk and low mission value suggest that premium freight and intermediate inventories are to be minimized. Moreover, visibility for the low value items in a compressed supply chain should not be seen as necessary. Wherever possible, the economies stemming from full truckload transportation should be captured. In addition, by not introducing an item into the materiel management processes of the Marine Corps until needed at the point of consumption, use of the vendors' distribution systems is heavily relied upon, thereby dramatically reducing government costs relative to distribution. This distribution cost burden is spread across the entire market's consumer base.

Bottleneck

Bottlenecks may from time to time require inventories at the wholesale level in order to overcome the increased risk imposed by the fewer available suppliers. Despite the low value, premium delivery may occasionally be warranted for the same reasons. A government distribution system or relationships with private distribution organizations must be in place to accommodate this requirement.

Leveraged

The higher mission value of items found in the leveraged category suggests that inventories at the retail level are warranted. Moreover, the higher mission value also justifies the use of less-than-truckload freight and premium modes of transportation. When such additional expenditures are incurred, asset visibility becomes substantially more appropriate and valuable. However, as with routine products, by introducing an item into the materiel management processes of the Marine Corps as close to the point of consumption as possible, use of the vendors' distribution systems is heavily relied upon, thereby dramatically reducing government costs relative to distribution. Again, the distribution cost burden is spread across the entire market's consumer base.

Critical

Critical items warrant asset visibility all the way through the distribution system, as well as expenditures for premium freight and inventories maintained at each level (vendor, wholesale, retail, and the using unit). Quantities may not be consolidated for the purposes of economizing on freight costs since these costs, as well as other materiel and distribution costs, are not important decision drivers for critical items. Very reliable distribution is essential. A government distribution system or enduring relationships (e.g., 3rd party logistics [3PL] providers) with highly reliable private distribution organizations must be in place to accommodate this requirement.

Reducing all of these issues and factors into a few visuals within the Quadrant Model context, it becomes obvious where one needs to concentrate resources and expertise for supporting USMC missions. (See Figure 25)

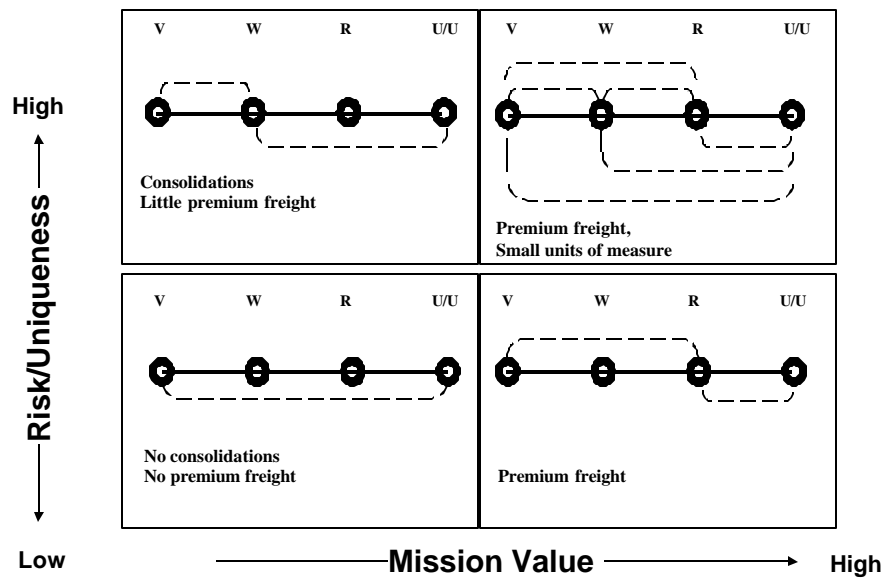


Figure 25: Distribution Variables (Quadrant Model)

PERFORMANCE MEASURES AND METRICS

Adequate performance measures are essential for the proper management of an enterprise. Performance measurement systems are a means to review the alignment of supply chain strategies and actions with organizational strategies. They provide for individual and organizational appraisal and feedback systems that shape supply chain strategies and programs. Critical to the implementation of the Quadrant Rank Model into the USMC is the need to revise the metrics used to measure logistics effectiveness and efficiency.

Currently, performance attributes are measured in aggregate, regardless of a product's risks or values. In addition, the collection, maintenance, and dissemination of data are resource-intensive. The USMC has collected data that are easily obtainable, rather than being meaningful in attaining the organization's goals. For instance, among current performance metrics collected are equipment repair order (ERO) counts and ton-miles. However, ERO counts and ton-miles do not convey in any significant way the success achieved in meeting the performance objectives of the USMC. Looking at the nature of the organization and the need for rapid deployment of logistics support, metrics that measure the performance of an organization should include supply chain response time and perfect order fulfillment. These metrics may be explained in terms of the seven R's: the right product, in the right quantity and the right condition, at the right place, at the right time for the right customer at the right cost.

The Quadrant Model also provides a scalable approach to direct resources to collect the most appropriate data. The Quadrant Model provides a tool to prioritize attributes according to their mission value and risk. It enables us to measure those performance attributes that are relevant with respect to a product's location within the quadrant.

The SCOR Model has established industry-wide performance measures and metrics. Furthermore, the performance measures and metrics outlined by the SCOR Model provide cross-enterprise applicability. The performance attributes measured are reliability, responsiveness, flexibility, cost, and assets. The Quadrant Model provides the requisite tool to evaluate the importance of these attributes according to the relative value and risk to the organization.

Routine

Routine items are characterized by low value and low risk. Therefore, all SCOR Model performance attributes, with the exception of cost, are relatively low in importance. Cost is the differentiating and most significant factor.

Bottleneck

Bottleneck items are similar to routine items in terms of low mission value. However, because there are only a few suppliers of these items, there is a greater risk of a stockout. Due to the greater risk associated with items in this cell, performance attributes such as reliability, responsiveness, and cost assume a medium level of importance.

Leveraged

Leveraged items have low risk and high mission value. The characteristic of high mission value pushes the performance attributes of reliability and responsiveness to a high level of importance. Since there are a number of sources of supply for leveraged items, performance attributes such as assets, flexibility, and cost are medium in importance.

Critical

Critical items are characterized by high risk and mission value. Reliability, responsiveness, flexibility, and assets are therefore high in importance. The criticality of the items in this cell makes cost low to medium in importance.

Regardless of where the items fall within the Quadrant Model, several questions must be answered:

- What is measured?
- Who measures it?
- Where is it measured?
- When is it measured?
- Why is it measured?
- How is it measured?

As a general rule, measures need to be conducted as close to the customer as possible in the least intrusive manner. The SCOR Model identifies metrics and performance attributes that can be used as a foundation for future USMC performance measures. While future metrics will be more customer facing focused, there remains a need to measure some internal performance attributes. Figure 26 below lists the level 1 SCOR metrics and attributes and their orientation (i.e., customer vs. internal facing). Items closer to the lower left quadrant will be measured with more emphasis on internal facing measures (primarily relating to efficiency) while items closer to the upper right of the quadrant will be more external focused (primarily emphasizing effectiveness or responsiveness).

	Customer-Facing		Internal-Facing		
Metrics	Performance Attributes				
	Reliability	Responsiveness	Flexibility	Cost	Assets
Delivery performance	X				
Perfect order fulfillment	X				
--Fill rate		X			
--Order fulfill lead time					
SC response time			X		
Production flexibility			X		
Total SC mgmt cost				X	
Cost of goods sold				X	
Value-added productivity				X	
Warranty cost or returns processing cost				X	
Cash-to-cash cycle time					X
Inventory days of supply					X

Figure 26: SCOR Performance Attributes and Level 1 Metrics

APPENDIX B

BUSINESS RULES APPLICATIONS

APPLICATIONS

Application of the Quadrant Model significantly impacts acquisition/development, procurement and contracting, and materials management. These activities can be divided into two distinct operating time frames: item introduction, as when acquisition/development is determining a specific need, or when procurement and contracting is engaging suppliers; and sustainment, where materials management controls stock locations and levels.

Using the descriptions/definitions developed for the military applications of the Quadrant Model discussed earlier, including materiel attributes, supply chains, vendor relationships, inventory rationalization, performance metrics, and distribution variables, the following key, or high-level, business rules were derived:

1. At item introduction, acquisition/development, and/or procurement/contracting personnel should endeavor for placement to the lowest left corner of the quadrant as practicable.
2. During sustainment, materiel management needs to take actions to (a) maintain items in the lower left of the quadrant, and (b) move, whenever practicable, those items that may have been originally located in the upper right, farther to the lower left.

Material Attributes

With the extreme values being routine and critical, the above rules suggest that the expending of scarce resources is diminished when items can be properly allocated. More effort and resources should be devoted, by definition, to criticals, and, where appropriate, lower risk/mission value items should be moved to the lower left, as shown below:

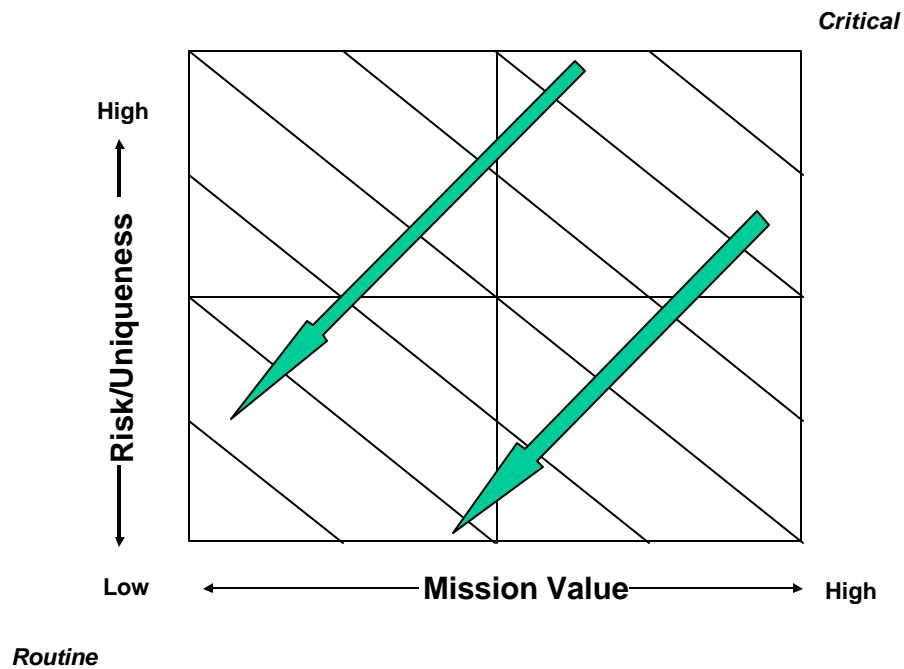


Figure 27: Goal for the Quadrant Model (Material Attributes)

Supply Chain

As described previously, each cell of the Quadrant Model has its own particular form of supply chain, with the one for criticals being complex, the one for routine, quite simple. This is one more illustration of why items should be forced, whenever practicable, to the strata of the lower left.

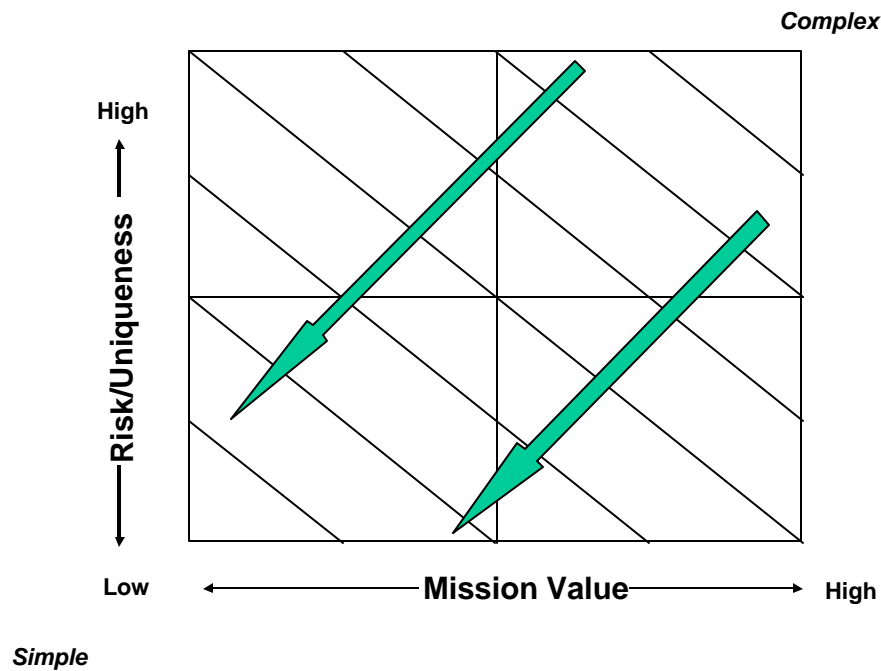


Figure 28: Goal for the Quadrant Model (Supply Chain)

Vendor Relationships

Superimposing the typologies of vendor relationships on the Quadrant Model, the extremes would be partnerships in the upper right; opportunistic sourcing in the lower left. Clearly, not all items are deserving of the resource-intensive relationships, but should be able to take advantage of the multiplicity of options available at lower levels. As a corollary business rule, the USMC needs to “routinize” vendor relationships wherever practicable.

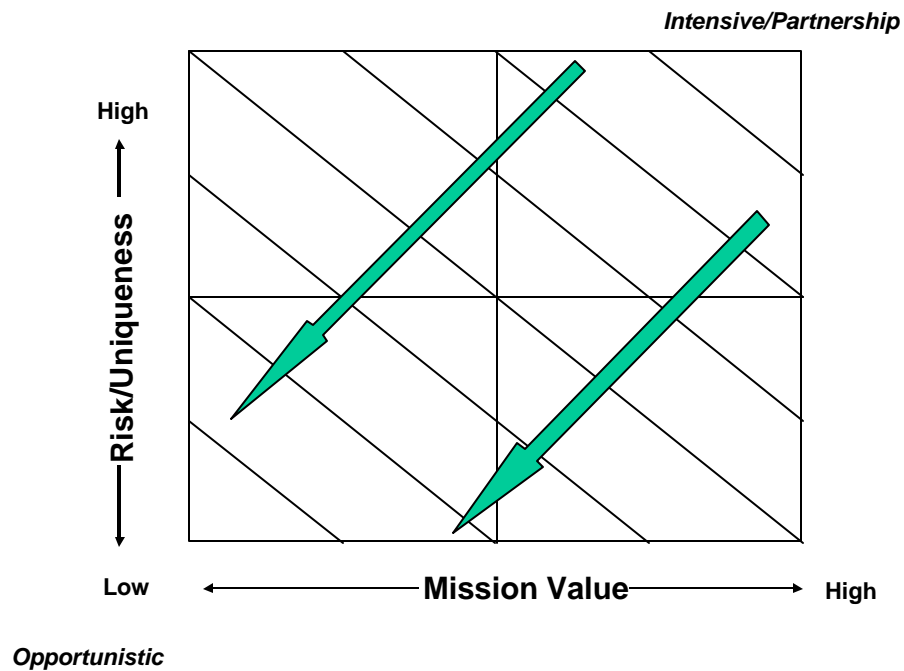


Figure 29: Goal for the Quadrant Model (Vendor Relationships)

Inventory Rationalization

When mission value is high and the supply market provides for few alternatives, the obvious solution is to add multiple stocking levels of inventory as a protective measure. Conversely, when items possess low mission value and low risk imposed by the supply market, little or no inventory stocks are warranted. The extremes represented on this version of the Quadrant Model would be More versus Less, as shown.

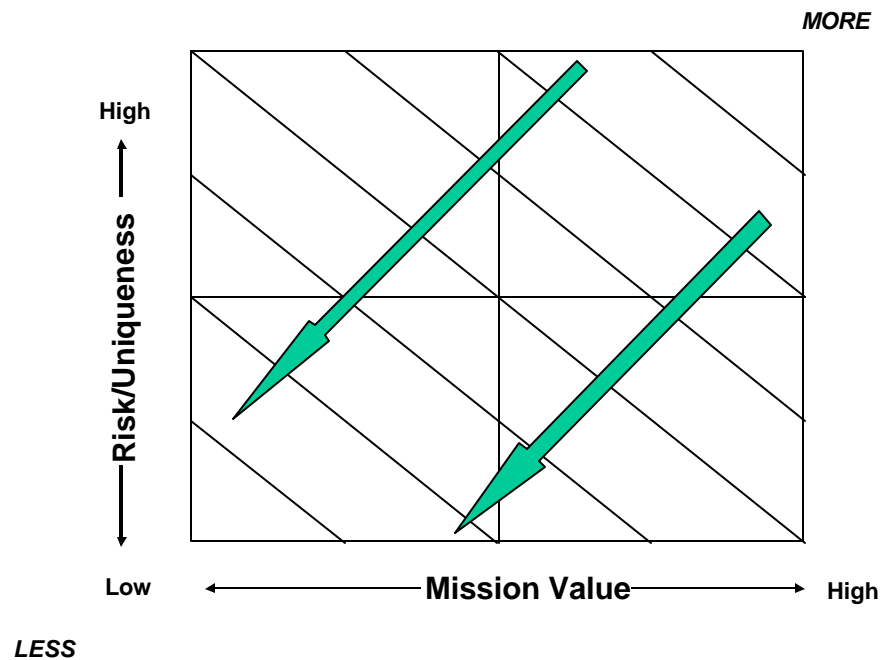


Figure 30: Goal for Quadrant Model (Inventory Rationalization)

Performance Measures and Metrics

All of the actions suggested by the Quadrant Model for critical, or high mission value and high-risk items, indicate the highest concern for the ultimate user, (u/u) meaning that performance measures should have a user focus on elements such as quantity and availability. Routine items, by contrast, will have a greater focus on such inwardly focused measures as cost to execute transactions and unit purchase price.

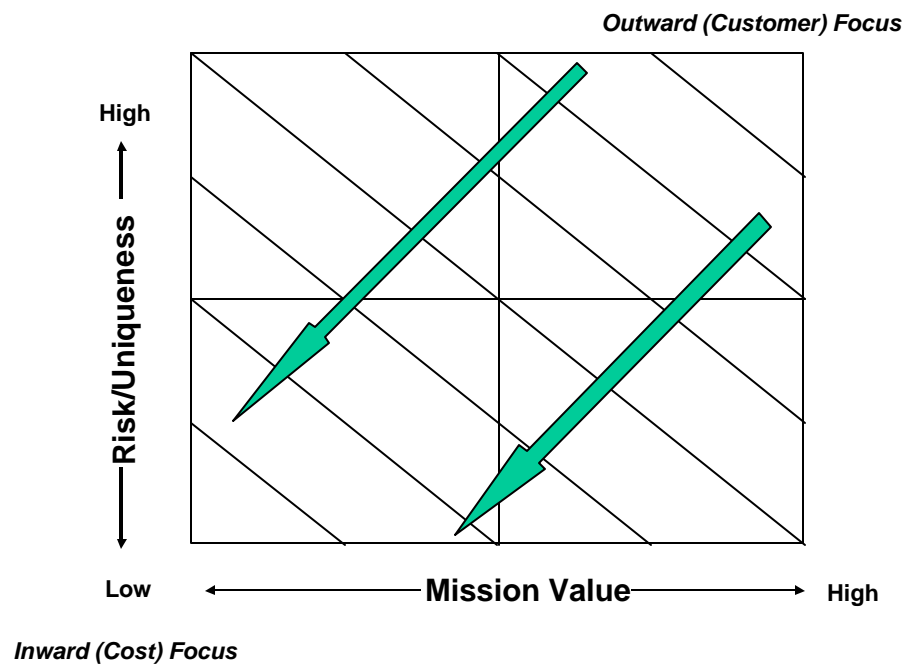


Figure 31: Goal for Quadrant Model (Performance Measures and Metrics)

Distribution Variables

Critical items, by definition, frequently receive additional investment in the form of small shipment sizes, often by premium modes of transportation, as well as being stocked at multiple nodes in the distribution system. This addresses both the high mission value and the high risk potential for availability and delivery variation. Routine items, representing the opposite extreme within the quadrant, most often will have minimal stocking nodes, most often just at the vendor, as well as opportunities to economize on transportation by consolidating loads. Premium freight is not expected to be necessary in the lower left cell of the quadrant.

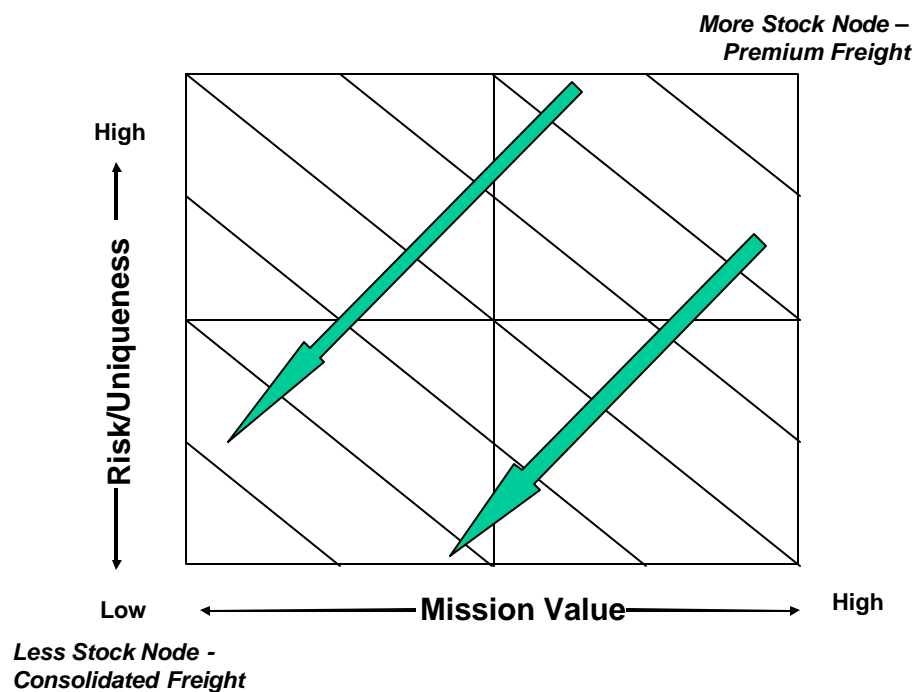


Figure 32: Goal for Quadrant Model (Distribution Variables)

Summary

The high-level business rules serve as a departure point for developing the business rules required to successfully implement the Quadrant Model within the Marine Corps. During phase C of this project, we recommend that a stepped approach be considered that would introduce a series of rules that would help stratify the materiel into one of the cells of the Quadrant Model. The goal of this process should be to identify the specific business rules that would accurately locate materiel according to its value and risk to the organization. This approach should likewise provide fidelity to the assignment process.

Appendix C: Definitions

Collaborative Planning, Forecasting, and Replenishment (CPFR) – A concept that allows collaborative processes across the supply chain, using a set of processes and technology models that are

- Open yet allow secure communications
- Flexible across the industry
- Extensible to all supply chain processes

Economic Order Quantity (EOQ) – The replenishment order quantity that minimizes the combined cost of inventory maintenance and ordering.

Supply Chain Management – A collaborative strategy to link cross-enterprise business operations to achieve a shared vision of market opportunity. It is a comprehensive arrangement that can span from raw material sourcing to end consumer purchase.

Supply Chain Operations Reference (SCOR) Model-

- **Supply Chain Asset Management Efficiency-** The effectiveness of an organization in managing assets to support demand satisfaction. This includes the management of all assets: fixed and working capital. The level metrics are cash to cash cycle time, inventory days of supply, and asset turns.
- **Supply Chain Costs-** The costs associated with operating the supply chain. The level 1 metrics are cost of goods sold, total supply chain management costs; value added productivity, and warranty/returns processing costs.
- **Supply Chain Delivery Reliability-** The performance of the supply chain in delivering the correct product, to the correct place, at the correct time, in the correct condition and packaging, in the correct quantity, with the correct documentation, to the correct customer. The level 1 metrics are delivery performance; fill rates, and perfect order fulfillment.
- **Supply Chain Flexibility-** The agility of a supply chain in responding to marketplace changes to gain or maintain competitive advantage. The level 1 metrics are supply chain response time and production flexibility.
- **Supply Chain Responsiveness-** The velocity at which a supply chain provides products to the customer. The level 1 metric is order fulfillment lead times.

Risk – The numbers of sources (vendors) available determine a product's risk. Other dimensions include product reliability, product durability, product substitutability, and the ability of the market to respond to fluctuations in demand.

Value – A product's value is determined by the contribution it makes to the accomplishment of the mission.

Appendix D: Mission Area Analyses

Capability	Amphibious Operations (Forcible Entry)	Amphibious Operations	MOOTW	Ground Combat Operations	Overall	Rank
Deploy Forces to Area of Operations	4.1%	4.1%	3.6%	3.5%	4.2%	1
Conduct Maneuver/Maintain Mobility	3.8%	3.8%	2.8%	3.7%	3.8%	6
Dominate the Area of Operations	3.8%	3.8%	2.0%	2.8%	3.4%	14
Plan and Direct Intelligence Operations	3.3%	3.3%	3.6%	3.2%	3.3%	19
Collect Information	3.3%	3.3%	3.6%	3.4%	3.3%	17
Produce Intelligence	3.2%	3.2%	3.0%	3.4%	3.2%	20
Disseminate Intel	3.5%	3.5%	3.7%	3.4%	3.5%	10
Plan and Direct Fires	3.8%	3.8%	1.5%	3.9%	3.3%	18
Process Targets	3.6%	3.6%	1.4%	3.7%	3.1%	23
Attack Targets	3.8%	3.8%	1.9%	3.6%	3.3%	16
Plan and Employ C2W	3.0%	3.0%	2.3%	2.3%	2.7%	26
Arm. The capability to provide munitions to weapons systems	3.8%	3.8%	2.1%	3.7%	3.4%	11
Fuel/Water the Force	4.1%	4.1%	2.9%	3.7%	4.0%	3
Repair/Maintain Equipment	3.0%	3.0%	2.1%	3.1%	3.0%	24
Provide Personnel and Personnel Support	2.8%	2.8%	1.8%	3.0%	2.8%	25
Provide Transport Services	2.8%	2.8%	2.2%	2.8%	3.1%	21
Supply the Force	4.1%	4.1%	2.6%	3.4%	3.9%	8
Perform Engineering Support	3.6%	3.6%	2.4%	3.4%	3.4%	13
Provide Health Services	3.5%	3.5%	2.9%	3.5%	3.4%	15
Provide General Services	1.5%	1.5%	2.8%	1.7%	1.8%	30
Provide Total Asset Visibility	2.8%	2.8%	1.9%	3.1%	3.1%	22
Provide Connectivity, Communicate Information	3.8%	3.8%	3.6%	3.7%	3.9%	5
Assess Situation	3.6%	3.6%	3.8%	3.7%	3.7%	8
Determine and Plan Actions and Operations	3.6%	3.6%	3.6%	3.7%	3.7%	9
Direct, Lead and Synchronize the Forces	4.1%	4.1%	3.8%	4.2%	4.2%	2
Enhance Survivability	3.6%	3.6%	3.6%	3.9%	3.8%	7
Rescue and Recover	1.4%	1.4%	2.1%	2.4%	1.7%	31
Provide Security	2.8%	2.8%	3.6%	3.7%	3.4%	12
Conduct Military Law Enforcement	1.6%	1.6%	3.0%	1.9%	2.0%	29
Contamination Avoidance	2.3%	2.3%	1.6%	2.3%	2.3%	27
Decon, Shelters, Collective Protection	2.3%	2.3%	1.7%	2.3%	2.3%	28

Appendix E: Acronym List

C2	Command and Control
COTS	Commercial Off The Shelf
CPFR	Collaborative Planning, Forecasting, and Replenishment
DLA	Defense Logistics Agency
DoD	Department of Defense
EOQ	Economic Order Quantity
HQMC	Headquarters United States Marine Corps
ILC	Integrated Logistics Capability
IT	Information Technology
ITV	In-Transit Visibility
JV	Joint Vision
LC	Life Cycle
MATCOM	Marine Corps Materiel Command
MCCDC	Marine Corps Combat Development Command
NBC	Nuclear, Biological, and Chemical
OEM	Original Equipment Manufacturer
POA&M	Plan of Action and Milestones
POL	Petroleum, Oils, and Lubricants
PWRM	Pre-positioned War Reserve Material
QOL	Quality of Life
QUAD	Quadrant Model
R	Retail
SC	Supply Chain
SCC	Supply Chain Council
SCOR	Supply Chain Operational Reference
TAV	Total Asset Visibility
U/U	Using Unit

V	Vendor
W	Wholesale
WRM	War Reserve Materiel
WRMR	War Reserve Materiel Requirement

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